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HEARINGS

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BEFORE THE

U.S. Congress, House.

SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,

HOUSE OF REPRESENTATIVES,

CONSISTING OF

Messrs. WALTER I. SMITH (chairman), J. W. KEIFER, J. V. GRAFF, J. J. FITZGERALD, and STEPHEN BRUNDIDGE, Jr.,

IN CHARGE OF

THE FORTIFICATION APPROPRIATION BILL.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1906.

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FORTIFICATION APPROPRIATION BILL.

Hearings conducted by the subcommittee, Messrs. W. I. Smith (chairman), J. W. Keifer, J. V. Graff, J. J. Fitzgerald, and S. Brundidge, jr., of the Committee on Appropriations, House of Representatives, in charge of the fortification appropriation bill, on the days following, namely:

THURSDAY, *January 25, 1906.*

ENGINEER DEPARTMENT.

STATEMENTS OF BRIG. GEN. ALEXANDER MACKENZIE, CHIEF OF ENGINEERS, U. S. ARMY, AND MAJ. FREDERIC V. ABBOT, ASSISTANT TO THE CHIEF OF ENGINEERS, U. S. ARMY.

The CHAIRMAN. General, the clerk of the committee was requested some time since to ask you to bring with you at this time a table of unexpended balances of these appropriations.

General MACKENZIE. Yes, sir; I have it for each item.

CONSTRUCTION OF GUN AND MORTAR BATTERIES.

Mr. SMITH. The first item of this bill is one for the construction of guns and mortar batteries, and the Secretary of War has reduced the estimate to nothing?

General MACKENZIE. Yes, sir.

Mr. SMITH. What is the amount of unexpended balance under that appropriation at the latest date that you can now give us?

General MACKENZIE. $585,015.41.

Mr. SMITH. At what date was that, General?

General MACKENZIE. That was December 31, 1905.

Mr. SMITH. What, if any, outstanding contracts were there involving the expenditure of that money?

General MACKENZIE. There was nothing in which that money was involved. We actually had on hand at the end of the year $709,000. The difference between that and the other figure that I gave is covered by outstanding liabilities and uncompleted contracts, which aggregate about $124,000.

Mr. SMITH. In view of your statement with reference to this item, we may assume that all our balances are reduced by subtracting outstanding contracts, except as otherwise stated?

General MACKENZIE. Yes; we have always taken out from the money on hand the amount covered by contract. That is all given, Mr. Chairman, in this table item by item—the outstanding liabilities and the uncompleted contracts.

Mr. SMITH. You have a table of all matters covered by appropriations under the control of the Engineer Department up to the 31st of December?

General MACKENZIE. Yes, sir.

Mr. SMITH. Is that table in such form that you can hand it to the reporter, so that we can put it in the hearings?

General MACKENZIE. I could, but I believe it has not been customary for the subcommittee to publish these tables and matters of that kind in the hearings. We have always furnished these tables, but of course with regard to many of these details touching fortifications, where they are given in detail, as is done here now, the locality and the amount available for each having been detailed, ordinarily have not been printed in the hearings.

Mr. SMITH. I realize that it was not customary to print them in the hearings, but I did not know there was any objection to printing the totals.

General MACKENZIE. The totals are of course added for the different localities, and there would be no objection, certainly so far as the committee is concerned, to giving the totals.

Mr. SMITH. You mean allotments have been made to localities from the appropriation as well as the bill itself?

General MACKENZIE. Yes. This shows the amount for each locality.

Mr. SMITH. So that it would be better, if I understand you, General, it would be better as to each item in the bill to ascertain the total expenditure under the item rather than print the detailed statement you have there?

General MACKENZIE. Yes. As to the other balances that are shown in the tables, it should be understood that these amounts are all allotted to these various localities. They are not available for new work, you might say.

Mr. SMITH. They are allotted, but no contracts are out on that?

General MACKENZIE. They are allotted but not covered by definite written contracts.

Mr. GRAFF. But they could not be expended for any other locality?

General MACKENZIE. They could, but it is not desirable that they should be. This amount of money is required to complete work that is already under way at these particular localities.

Mr. SMITH. What were the annual expenditures under this item during the last fiscal year, if I may use that term, although it possibly does not apply to this bill? If you have it there for the year previous to the 31st of December, it would be satisfactory; that is, the total.

Major ABBOT. This year is the first year that our expenditures have been divided on the 31st of December. Our figures for previous years are not brought up to the same date. It could be found out; but it has not been calculated in that way.

Mr. SMITH. Have you any figures for the fiscal year or any other showing the average of expenditures in past times under this head?

Major ABBOT. We have not got it here.

General MACKENZIE. We have not given much consideration to this item in the way of figures, inasmuch as there was no new appropriation asked for.

Mr. FITZGERALD. Let me ask you this, General: Does the Secretary of War omit this recommendation because of the fact that this new board that had been appointed to review the Endicott board plan had not yet completed its work and made its recommendations?

General MACKENZIE. I could not say certainly. That may have had some influence, but I think it was more with the idea of cutting down the estimate. Of course, the estimates as presented were very large, and the Secretary instructed that they be reduced quite a large amount.

Mr. FITZGERALD. In your annual report you give an estimate "For construction of gun and mortar batteries." Was any particular line of batteries and mortars contemplated by this estimate that would have been required under the Endicott plan?

General MACKENZIE. That estimate, which the Secretary of War omitted, was for going ahead and starting new works in accordance with the Endicott board plan. We still have estimates for the work of bringing some of the older fortifications up to date, and of putting in some accessories in the way of fire control, and searchlights, and matters of that kind. Such things were retained, inasmuch as it was thought that only a limited amount of appropriation would be granted, and these items were considered to be of more importance at the present time than to go on with new works. That was the main reason. It was upon our own suggestion, to a large extent, that the reduction was made by the Secretary of War, and that this item was stricken out.

Mr. FITZGERALD. Your annual report is not published?

General MACKENZIE. It is published, but so far as the fortification work is concentrated it is rather general.

Mr. SMITH. Is there any other member of the subcommittee who desires to ask General Mackenzie a question on this item?

Mr. KEIFER. I want to ask a question in order to find out the uniform rule—why there was a change in the allotments from the fiscal year to the calendar year.

General MACKENZIE. Not a change of allotment, but this statement of balances available that we have brought with us is made up to the 31st of December.

Mr. SMITH. That was done on my request in order that we might have the latest possible information as to what the balance was, for the benefit of this committee.

Mr. KEIFER. Then it was not a change at all, but merely a matter of convenience in getting the figures?

General MACKENZIE. Yes.

Mr. SMITH. We thought a statement up to the 1st of January would be valuable, inasmuch as these are not annual appropriations, but are available until expended. The later they come down the more satisfactory. I requested Mr. Courts to ask him to bring them down to the 1st of January.

MODERNIZING OLDER EMPLACEMENTS.

The next item is for modernizing older emplacements. What is the available unexpended balance of this on the 31st day of December?

General MACKENZIE. $332,626.96.

Mr. SMITH. Now, during the time since this appropriation was made a year ago you have only expended about $120,000 of the $450,000 that was given?

General MACKENZIE. I would explain that, Mr. Chairman, in this way: Of course we can not go ahead or make arrangements for the expenditure of this money until we get it. That is, we can not expend it until it is appropriated. It then becomes necessary to have the different officers throughout the country report as to the character of work that is needed under this appropriation.

We get their estimates in the office, and of course the total amount of these generally exceeds very materially the amount of the appropriation. We then have to allot it. Then the detailed drawings have to be be made, so that it results that during the first half of the year very little construction is done, and the main part of the expenditures comes in the second six months; so that now the plans are all made and arrangements are made, and this amount will be expended fully by the close of the fiscal year.

Mr. SMITH. Now, you say that after you get the appropriation you send out to the different places for information as to just what is needed. You have, of course, General, information on this subject before you can make your estimates of the total cost?

General MACKENZIE. Oh, yes; of course; but it is with a view to getting the latest information and selecting and determining which are the most urgent pieces of work to be done with the amount actually given by Congress.

Mr. SMITH. Have these new emplacements or new designs of emplacements greatly improved the efficiency of these guns?

General MACKENZIE. Yes, sir; of course; and they are absolutely necessary, you may say, for the proper handling of the guns. They are built especially in connection with the operation of the new improved ordnance.

Mr. SMITH. You speak chiefly of the improvement in the stability of the emplacements?

General MACKENZIE. You are referring to this item, are you? Of course many of these emplacements were built ten years or more ago, and there have been constant changes and improvements and little modification in ordnance and in the operating of guns, and there has been a gradual improvement in the construction of emplacements.

Mr. SMITH. But in the report of Major Abbot, Acting Chief of Engineers, stress seems to be laid on the ability of the new emplacements to withstand the blast and jar due to the use of smokeless powder?

General MACKENZIE. Yes.

Mr. SMITH. Will not the old emplacement for a reasonable time stand that jar?

Major ABBOT. It is not so much the jar. The portion of the parapet right under the muzzle of the gun is what suffers from the new smokeless powder, and in the older batteries that is made of Rosendale cement, which is eroded several inches every time the gun is fired. It has to be replaced; but if you cut down that upper surface of Rosendale cement some 18 inches deep over a considerable area and replace it with Portland cement it will withstand the blast of smokeless powder. With the advent of smokeless powder the blast was

greatly increased, and this necessitated this change to be made on all the older emplacements, which perfectly withstood the effects of brown powder.

Mr. SMITH. To what extent does it impair the efficiency of the guns now in service—the form of guns now in service—the fact that this old form is in use?

Major ABBOT. The injury is not serious, but the looks of the batteries are impaired, and that attracts the attention of inspectors every time they see it. It looks ragged to have broken-up slopes and embankments around the guns, and numerous official protests and complaints follow. As to the effectiveness in time of war, there would be practically no effect. With the passage of time and the action of frost the upper surface of the injured parapet would be disintegrated unless the surface was maintained so that the water would run off. The frost would penetrate and the freezing would crack the cement so that these breaks certainly ought to be repaired. When the Rosendale top layer is replaced with Portland-cement concrete of sufficient thickness it protects all the rest of the Rosendale concrete parapet below.

Mr. SMITH. You see we are simply trying to find out how pressing that is.

General MACKENZIE. That is only a portion of the work that comes under this item. The other point is improving the delivery of ammunition to the guns.

Major ABBOT. The guns now fire about once a minute. The guns that were first supplied to us were expected to fire about once in five minutes, and in the first instance we provided ammunition service for that rate; but inasmuch as the guns, by modifications of the carriages, can now be fired once in a minute we must overhaul our ammunition hoists and other methods of ammunition supply in order to get the powder and ammunition to the guns as rapidly as they can be fired; that has entailed a very large expenditure.

Mr. SMITH. This is chiefly a civilian committee. Does the emplacement include all means of delivering the ammunition?

Major ABBOT. Yes; the Ordnance Department supplies the carriage and the gun only. We supply the parapets and loading platforms, magazines, and projectile rooms, as well as all means of transporting ammunition and projectiles from the lower stories of the batteries to the upper levels.

Mr. SMITH. I did not mean so much what the Engineering Department had charge of as whether the modernizing of the older emplacements technically included the means of transportation of the ammunition.

Major ABBOT. Yes; it does. It includes modernizing everything exterior to the gun carriages.

Mr. KEIFER. It is not only necessary to have improved conditions in order to protect the guns and gunners, but it is really a part of the fortification. Is not that the principal thing?

Major ABBOT. Yes; the gun crews were well protected in the older emplacements; but they want conveniences now necessary in handling the ammunition with the required speed—they want more area. One of the items in this heading is consequently widening platforms. They used to be able to ram the charge home with a rammer staff projecting beyond the loading platform, but now the rammer has to be

handled so fast that the crew needs more room so they can reach the end of it; as a result we had to add to the width of the loading platform.

Mr. KEIFER. It is just as essential to keep that in perfect condition as any other part of the fortification?

Major ABBOT. Yes; that is right.

Mr. SMITH. Now, there is another matter that I wanted to interrogate you about, General. After you got the $450,000 you said you sent out for detailed information as to how much would be needed at each place. You have made no change, however, in you estimate of the total cost of this work. Did not this more detailed and later information make any change at all in the estimate of what would be required to complete the work?

General MACKENZIE. The general character of work is not changed by sending out this information. We sent out to get more details. We sent out to get detailed plans for these different portions of the work in different localities.

Mr. SMITH. Would not that more full information in any degree change the estimate in any amount as to the completion of the work of modernizing these emplacements?

General MACKENZIE. This amount may change, of course, Mr. Chairman; new necessities may come up, but up to the present time we have not seen any occasion for changing that estimate as first made.

Mr. SMITH. So that these detailed estimates as they first came in did not exceed your estimate?

General MACKENZIE. They would be detailed plans, you may say, of doing a certain piece of work. Say there was an item for widening the platform and an item for a new ammunition hoist, these plans would cover all details with respect to that particular work. Of course, at any time, adding all the detailed estimates together, they would give a little different figure from that $942,500, but up to this time there has been no necessity for changing that figure.

Mr. SMITH. This appropriation of $450,000 under the law, as I am now advised, was available, not at the commencement of the last fiscal year, but as soon as the bill was signed. Is that correct, as you understand it?

General MACKENZIE. Yes; on the 3d of March.

Mr. SMITH. So that in place of this expenditure that you have made covering six months, it has, in fact, covered ten months and more; about ten months. Is that right?

General MACKENZIE. Yes.

Mr. SMITH. The appropriation of March 3, 1905, was the first appropriation for this item.

General MACKENZIE. I would suggest that the season of the year necessarily cuts quite an item.

Mr. SMITH. It is practically a full year, as far as working seasons are concerned, since that $450,000 was appropriated, is it not, General? There would be no time between now and the 3d of March that would be seasonable for construction work, so that you have in fact had all of a seasonable year.

General MACKENZIE. We have had the appropriation for one seasonable year, but the preliminary work of getting plans and allotting

the funds and selecting the most important items of work took up a large part of the time.

Major ABBOT. There is an immense amount of detail that has to be worked up in each district after the district engineer officer has been informed of what sum he is going to get. When the bill is passed by Congress we form a general idea as to which items in the general estimate throughout the whole country we can take up. We then send out to the district offices for drawings showing what they would do with it. No two of these places are exactly alike. Because you could put an extension on one battery for $2,000 it does not follow you could do it on the next one for $10,000. It has to be worked out carefully with drawings and sections, so that we can see in the office of the Chief of Engineers whether the local officer's plan is good, or whether it should be modified and made like some other adopted at another place.

We are continually checking up and looking over those drawings. There is a vast number of those places all over the United States to be considered, and it takes a long time to get these questions fully considered and the detailed plans approved so that the officers can go ahead and begin their work. Then cement has to be advertised for. It takes thirty days for advertisement and thirty more for getting in the bids and deciding on the award here in Washington; in addition, with a bill passing on the 3d of March the actual money is not available in the Treasury before the middle of April or the 1st of May, due to neccessary formalities in the Treasury Department. The drawings oftentimes take several months to make, and after that the contract has got to be drawn up and executed. You have to study carefully to see where the old steel beams are, and to fit new appliances into the old works. It can not be done in a hurry. If an attempt is made to do it in a hurry, you will perhaps cut away some of the main supports of the battery and let the roof fall in.

The drawings did not get to my desk for final approval much before some time in September; either the latter part of August or up to the middle of September. The drawings keep piling up on my desk, and even if I can get through with them as they come in, it is nearly the end of the working season, in the northern part of the country, before a beginning can be made in the advertising for materials. In getting this work done economically, and in accordance with a reasonably uniform system throughout the country suited to our special needs, months are well spent. The work is quite different in the South from what it is in the North on account of the action of the sun and ice and frost. We can use much cheaper construction there. All that has to be considered before approving the local plans, so that while we have had the money ten months to-day, the plans are only now in such shape that we can actually start construction vigorously with the opening of the coming spring.

Mr. SMITH. I did not refer so much to the opening of actual work as to the fact that contracts had not yet been let.

Major ABBOT. We contract for the cement and for the steel, but the rest of it can only be done to the best advantage by hired labor.

Mr. KEIFER. All material that costs a considerable sum has to be furnished by advertising and bids?

Major ABBOT. Yes; there is competition invited in buying every-

thing, and the larger items are bought under formal contract. The work is done by hired labor.

Mr. FITZGERALD. I would like to know, as to this unexpended balance, whether the money is actually free or whether it is apportioned yet?

Major ABBOT. Practically the whole of it has been allotted. The local officers have been told, for instance, you can expend $15,000 here for such and such work on such a battery; but the money has not yet been expended, although the plans have, I think in all cases, been approved.

Mr. FITZGERALD. Has the $120,000 not reported as available been actually expended?

Mr. SMITH. It is actually contracted for.

Major ABBOT. Yes; $120,000 has actually been drawn out in checks. To be more exact, I should say about $101,000 has been absolutely drawn out in checks, about $13,000 is to cover bills for which materials have been supplied but for which payments have not yet been made. Then there is covered by uncompleted contracts about $4,000, leaving the actual balance available $332,626.96. However, almost the whole of that apparent balance has been promised to the different localities for which plans have been prepared and where the officers will spend that money as fast as the work can actually be done. The money is to the credit of those works, but not yet to the official or personal credit of the officers who will disburse it. They receive the actual credits only as they are necessary for the payments.

Mr. FITZGERALD. There is another thing I would like to know: How did you estimate $942,000 would be required to change these emplacements unless you had the detailed estimates of the cost in advance?

Major ABBOT. The general plan of modernizing the old emplacements was first considered by the Board of Engineers, who prepared drawings of the older types of batteries, with additions in red, showing what should be added to them. Then these drawings were lithographed and copies were sent out to each district officer. Each district officer was then called upon to estimate the cost of changing each one of his old-type batteries to the style of battery shown in red in the lithographic drawings. Without going to the expense of making detailed drawings they made as close an estimate as they could of what would be required, and $942,500 was the total of those local estimates. When we come to the next step, of actually doing the work, we can not trust to the type drawings as sent out, but must go to the separate individual batteries and find out in each case every idiosyncracy or characteristic and adopt a plan that will agree in the general result with those type plans, though perhaps differing in many details. These detailed drawings have to be checked up for each battery in the office of the Chief of Engineers before the money is actually placed to the credit of the district officers who do the work.

Mr. FITZGERALD. You say the money necessary to change all these batteries was $942,000?

Major ABBOT. Yes.

Mr. FITZGERALD. Has any additional information been received in the office of the Chief of Engineers to show that a larger sum than that would be required?

Major ABBOT. On the contrary, the estimates that have come in for the detailed work——

Mr. FITZGERALD. I do not mean detailed work, but additional work——

Major ABBOT. No; not at the present time. In the light of the first ten months' experience we believe we can do all we started out to do with the original estimate. That may not be sufficient eventually, however, because there may be some facilities for new artillery needs that are not covered by the estimate. To bring the batteries up to what the artilleries said they should be the $942,500 will suffice. It is enough to do what was originally estimated.

Mr. KEIFER. We are proceeding on the idea that we will appropriate $900,000.

Mr. FITZGERALD. They only ask for this year $450,000.

Major ABBOT. We ask for the balance of the $942,500 this year.

Mr. KEIFER. When you speak of years, you are speaking of fiscal years in your talk now, or calendar years?

Major ABBOT. I am speaking of calendar years, working seasons.

Mr. SMITH. There is no fiscal year in this for any purpose?

Mr. KEIFER. The estimates are for fiscal years.

Mr. SMITH. No——

Mr. KEIFER. What does that mean, if not that—"Estimates for 1907?"

Mr. SMITH. It is merely for convenience. That is what I was troubled about myself, whether that estimate was not made for the purpose of terminating on June 30, 1907.

Major ABBOT. No. In other words, while Congress does not adjourn at exactly the same time each year (they have a long and short session), we get only one appropriation in a year, and the estimates are intended to carry us through, not the fiscal year, but the working season.

Mr. FITZGERALD. These estimates are really a basis upon which you project your work?

Major ABBOT. Yes——

Mr. FITZGERALD. Even though it may not be completed in a number of years?

Major ABBOT. Yes.

Mr. GRAFF. This estimate that you have made of $942,500 does not mean an estimate for the entire completion of the improvement of these older emplacements in the country?

Major ABBOT. Yes, sir; that is what it does mean.

Mr. GRAFF. And that would complete, according to your estimate, the entire work in this particular line?

Major ABBOT. Yes; when we prepared that estimate it meant that it would enable us to take the older emplacements that have not all the modern conveniences and bring them up equal to those that we are building at this time, so far as the conveniences of ammunition, service, safety of the gun crews, and speed in the fire of guns are concerned.

Mr. KEIFER. Our appropriation would only make the total appropriation for the two years $900,000. Would that accomplish it all?

Major ABBOT. No. We would have to come back for the balance of the total amount, $42,500.

CONSTRUCTION OF FIRE-CONTROL STATIONS AND ACCESSORIES.

(See also page 53.)

Mr. SMITH. We will now go to the much-discussed item of fire control. What is the difference, if any, between fire direction and fire control, as used in the military service?

General MACKENZIE. I should not imagine there is any. Of course fire control involves and includes aiming and firing.

Mr. SMITH. I notice in some of the reports the use of the language "fire direction," and in others the use of the term "fire control." I was curious to know what was meant by the use of two different terms.

General MACKENZIE. We use the term "fire control," which covers all the range finding and the communications between the stations and the aiming of the guns and firing them—the whole subject.

Mr. KEIFER. Is not "fire control" much broader than "fire direction?"

General MACKENZIE. Oh, yes.

Mr. FITZGERALD. In the Secretary's report it is said, "It is estimated that the total cost of installing the system of fire control and direction, including range and position finders and electrical connections, will be in the neighborhood of $7,000,000." I noticed that myself——

General MACKENZIE. This item was formerly divided up into three parts. Now those parts are all brought together under the name of "fire control."

Mr. SMITH. Now, how many branches of the service expend money under this provision here for fire control?

General MACKENZIE. Three branches—the Engineer Department, the Ordnance Department, and the Signal Department or the Signal Corps.

Mr. SMITH. Now, what part of the work of one of these installations of the fire-control system is done by the Engineer Department?

General MACKENZIE. The procuring of all land needed, the construction of all buildings in connection with the work, and the stations; in fact, except the furnishing of instruments and lines of communication, everything.

Mr. SMITH. Who puts in the conduits for the purpose of carrying the cables?

Major ABBOT. We put in conduits for a certain distance in the rear of the emplacements, and we put the cables in trenches when the distances are longer than that. The signal corps conductors, as well as our own, are in suitable lead-covered cables covered with iron armor and are buried in trenches with just a plank over the top of them, and then the trenches are filled again with earth or sand. That method is very much less costly than vitrified conduit, and at the same time it enables us to get along with a less number of soldered joints and splices in the insulation of the cables.

Mr. SMITH. Do I understand you install some cables as well as the conduits?

Major ABBOT. Yes; we supply all the power cables and those for the electric lighting of the buildings; the Signal Corps supplies the cables in connection with the transmission of information.

Mr. SMITH. The telephone and telautograph lines also?

Major ABBOT. Yes.

Mr. SMITH. Are these cables carried in the same conduits?

Major ABBOT. Yes; if the cables run a great distance we use trenches. We bury the signal corps cables in the same trenches as our own.

Mr. KEIFER. It is a sort of plant that you install?

Major ABBOT. Yes; we supply the electrical generating machinery that is used for supplying light and power to the emplacements and fire-control station. We also turn over to the Signal Corps such power as they need. We give them a point on our switch board to which they can bring their wires, and they can use this current whenever they want to charge their batteries or operate their motor generators. Their system of communicating wires is entirely independent, however, from our system of light and power wires, so that each department has its own field of activity, and we unite at the switch board.

Mr. SMITH. Does the Signal Corps lay any conduits at all?

Major ABBOT. No, sir. On one occasion they volunteered to pay a part of the expense of a long trench.

Mr. SMITH. You told us in a general way what the Engineers do and what the Signal Corps do in connection with the installation of fire control. What does the Artillery do in that connection?

Major ABBOT. They select the points and tell us the number of the stations which they consider to be necessary in connection with the proper Artillery administration of the defenses.

Mr. SMITH. What do they do that requires the expenditure of any money in connection with it?

Major ABBOT. They do not expend any money.

Mr. SMITH. How is this appropriation disposed of as between yourselves and the Signal Corps and the Artillery?

General MACKENZIE. The Artillery are not interested in this—that is, they do not get any of this money——

Mr. SMITH. The Artillery furnish the general design, do they not, of the fire-control system and tell you what they want?

General MACKENZIE. Yes.

Mr. SMITH. But they draw no portion of this money?

General MACKENZIE. No.

Mr. SMITH. What does the Ordnance do?

Major ABBOT. It supplies all observing instruments, the Warner and Swasey position finders, and the azimuth instruments. It supplies all the drawings and drawing materials and drawing scales, the graduated scales, and the complicated instruments constituting the outfit of the position-finding stations.

Mr. SMITH. In a general way this fire-control system on land is similar in its purpose to range finding on the sea?

Major ABBOT. Yes; it is a refined and rapid system of triangulation.

Mr. SMITH. Both the range finding at sea, as it is practiced, and this system of fire control, so far as it relates to range finding, are on the same general principles, are they not?

Major ABBOT. Yes; they all depend on the solution of triangles, but the mechanism adopted to use on a ship at sea is about as different as it could be from what we do on land. They have to be

operated on vessels in motion, whereas on land there is a stable platform, and it is an utterly different proposition.

Mr. KEIFER. Your land apparatus would not work at sea at all?

Major ABBOT. No; it would not work.

Mr. SMITH. You could not get the base line?

Major ABBOT. On land we could use naval instruments and get a better result than they can get at sea, but the land apparatus could not be used at sea at all.

Mr. SMITH. Who apportions these appropriations as between the Engineers, the Signal Corps, and the Ordnance?

Major ABBOT. That was done last year by the Secretary of War after a conference with the different bureaus concerned. In other words, the artillery stated what ports they would like to have completed first. Then the different supply corps involved worked out what it would cost each one of them to complete their share of the fire-control installation at those particular selected harbors. Of course the amount of these three added together made a greater total than the amount of the appropriation. Then with mutual agreement between the different departments, and after full consultation with them, the Secretary of War finally allotted the million dollars contained in the last bill, so as to give each one of the departments concerned enough money to carry out as much of that work desired by the Chief of Artillery as could be accomplished with the money at hand.

Mr. SMITH. Can you tell us what the available balance of the whole of this fund was, or only of the allotment made to the Engineer Department?

Major ABBOT. Only the allotment as made to the Engineers.

Mr. SMITH. What was the allotment made to the Engineers?

General MACKENZIE. $590,000.

Mr. SMITH. And what was the available balance?

General MACKENZIE. $550,000.

Major ABBOT. The reason of the large balance is that there were six harbors at which work was intended to be covered by this $590,000. Of those harbors we got from the artillery detailed plans for New York within a few months after the passage of the bill. The detailed plans for Boston only came in last August, I think it was, and the detailed plans for Portland have not yet been finally adopted by the Chief of Artillery; of course we have practically therefore done nothing in that harbor or in any one of the three remaining harbors of the original six.

At Boston and New York a great deal of work has actually been done. A great deal of fire-control work has been done in New York with allotments of the balance of the previous year's appropriation for range and position finders.

Mr. KEIFER. And that did not exhaust this fund?

Major ABBOT. No; the fire control is peculiar in this, that it takes a very short time to expend a great deal of money, as there are a great number of small buildings which can be erected quickly, but it takes a long time to get the plans. [Laughter.] The buildings are small, but they are numerous, and we can put up a great number of them in a very few weeks. We can not begin to build them, however, until we know where they are needed.

Mr. SMITH. Do you know whether it is not a fact that a large portion of this money for fire control is being expended for purely temporary work, as wires strung upon poles, and the like of that?

Major ABBOT. That would be a signal corps question. We do not string wires on poles.

Mr. SMITH. I know; but as a matter of fact has not the fire control in some places been installed merely in a temporary way?

Major ABBOT. Yes; the range and position finder appropriations formerly made for the Engineer Department were originally expended very largely for small permanent brick or concrete observing rooms, with the idea that the plotting and relocating work would all be done in rooms we had provided in one of the emplacements in each battery.

As the artillery developed their system of fire control and direction, as it is now called, they decided it was necessary to have the plotting done in a room very closely adjacent to that in which the angles were read, and they found they needed much larger areas than we or they supposed would be needed in the first place; so each one of these original houses has had to be extended very considerably by the addition of a room in many cases twice as big as the original structure for the plotting, and after we had that extension put on the building we found the Signal Corps needed switchboard rooms, which in some cases were bigger than the plotting rooms. The number of wires is getting to be very great, and they had to put in switchboard rooms in connection with their telo-autographs; a comparatively large storage battery for signal corps uses also calls for some area, so that fumes will not enter the room in which the rest of their instruments are housed.

The first of these stations we enlarged with a permanent character of construction; but after we found how numerous the changes were we determined to make the enlargements with ordinary frame structures, so as to give the artillery a chance to see if they had got what they finally would want. It is much cheaper to change a wooden building than a brick building. So a large amount has been expended to complete these original installations with a less and less permanent form of structure. For a time the artillery was anxious to have all of the structures built of wood, because on the seacoast any brick or concrete work is necessarily damp, like a cellar, and in the plotting rooms it is desirable to have tracing linen and drawing paper and charts free from dampness, if possible.

When paper gets wet it expands and contracts and distorts. Certainly it is much more convenient, in time of peace, to have plotting rooms made of wood, because there is no condensation; drafting instruments do not rust; steel rulers and graduated scales do not get rusty and soil the drawings; in every way it is a better place to do such drafting work as is needed in working up this refined, intricate, mechanical triangulation. Thus a number of new stations have been built of plain wooden construction. At the present time we are endeavoring to get an equally cheap but less inflammable form of structure. The Engineer Department has always been afraid of putting wooden buildings where they would be exposed to artillery fire, even when they had protection to some extent against being directly hit by hostile projectiles. In the past season we have built three of

these new structures, experimental houses. One form has thin concrete-steel walls, one is corrugated steel, and one is wood covered with galvanized flat iron, painted to prevent shining in the sun. All these have to be tried before final adoption of a type to see whether they can stand the blast of their own guns. With a thin-walled structure the walls may crack and become useless after being exposed to the blast and jar of heavy gun fire in their vicinity.

Mr. KEIFER. Does that danger apply to wooden buildings if well constructed?

Major ABBOT. No; but these buildings—if you have never seen one of the places—constitute little villages. You have, for instance, at Fort Wadsworth, New York Harbor, from 12 to 14 of these little wooden houses in a line, separated by not more than a few feet from each other. A shell exploding there might burn them all down. We must have something that will be fire resisting, if not fireproof, and also capable of standing tremendous blast and jar.

Mr. SMITH. This is wandering somewhat far from the subject. Can you tell us what an average cost of complete installation of fire control per battery or gun is?

Major ABBOT. The report of the Chief of Engineers, made on the 30th of last June, contains the best approximation we could make under the conditions that existed then. The sum there stated, $4,263,364.47——

Mr. SMITH. I asked you if you can tell us the average cost per gun or per battery.

Major ABBOT. I can not do it.

Mr. SMITH. Is it not a fact that estimates have been given to work of this character varying from $400 to $4,000?

Major ABBOT. The problem is becoming more and more balanced and adjusted to a working basis, but up till recently the construction department has not known within several hundred per cent as to the size of buildings or number of buildings that were needed.

Mr. SMITH. That is just the thing that has been disturbing this committee for at least three years, to my knowledge. It has been the belief on the part of those then on the committee that this matter was still in the expirmental or developing stage, and therefore the query has arisen as to how fast we ought to install in many places these things before we have a definite and standard plan for their construction. Now, what we were anxious to get at to-day is how far this development has gone? Is it still experimental? Have you still been putting up temporary affairs? Is not this matter being too widely spread in the present stage of development?

Major ABBOT. We have been extremely anxious in the Engineer Department over that same question for the last five years, and we have endeavored, as the annual reports will show, each year to state to Congress definitely that we did not know what the total cost would be and could not tell. The bulk of the work duirng this last year, wherein we have been acting, as always, in absolute accord with the Chief of Artillery, has been to put in at the three harbors, New York, Boston, and Portland, the latest types. We started out to complete six harbors, but we found we had money sufficient only to do three. We started in these three harbors to build the latest types, and let you see——

Mr. SMITH. I understand it then will cost from $8,000 to $10,000 per gun?

Major ABBOT. I have no idea how much it will cost. The estimates will run in very widely different amounts, depending upon how the district officers understand the requirements of the artillery officers in their vicinity.

Mr. SMITH. Has the artillery to this hour got a standard plan of this fire control that stood six months?

Major ABBOT. I would rather have you ask the artillery when they have their hearing.

Mr. SMITH. Have they furnished you with a standard plan that stood six months unchanged?

Major ABBOT. That is a little difficult question.

General MACKENZIE. In connection with this temporary work I think it proper to say that it has been desirable, of course, and has been decided by the artillery, that their officers should have the opportunity of drilling with this fire control at all points, and that, of course, has led in many cases to putting up what may be considered temporary installations, but still, where it may form a part of the permanent system, to allow them to perfect themselves in its use, which was a very important matter.

Mr. SMITH. It seemed to us, General, that the knowledge on the part of the various branches of the service having to do with this was very vague and indefinite as yet. Now, you started work at Pensacola, as I understand, and that is the nearest completed of any, is it not?

General MACKENZIE. Experiments were made there for the purpose of developing the system.

Mr. SMITH. It is the nearest completed of any station, is it not?

Major ABBOT. No; New York Harbor is the nearest completed now.

Mr. SMITH. That was not true a year ago. Pensacola was then the nearest completed, as I understood.

Major ABBOT. The Pensacola installation was purely temporary. The stations were of wood, on high trestle framework. The principles governing this work were illustrated there, but those stations were built not as permanent stations, but were paid for out of an experimental fund allotted by the Board of Ordnance and Fortification.

Mr. SMITH. So that you had more money for that than the amount appropriated directly for it?

Major ABBOT. The Board of Ordnance and Fortification allotted, I forget how much—a large amount for experiments there.

Mr. SMITH. You had quite a sum of money not covered by any regular appropriation?

Major ABBOT. Yes.

Mr. KEIFER. It was for experimental purposes?

Major ABBOT. Yes; it was appropriated by Congress for any experimental purposes, and a large allotment was made by the Board of Ordnance and Fortification to develop the possibilities of this line of work.

General MACKENZIE. I think the whole War Department, the Secretary of War, the Chief of Staff, the Chief of Artillery, and all the bureaus have firmly been convinced of the desirability of finishing

up a few points, and are now working in that direction. As I say, of those started out in the order of their importance, New York is now well under way.

Mr. SMITH. Assuming that you had a little over half of this appropriation for your branch—is that correct?

Major ABBOT. It was this last time. I do not remember what the items were in previous appropriations.

Mr. SMITH. So that you had probably close to a million dollars in the Engineer Department for this work?

Major ABBOT. Yes.

Mr. SMITH. You have expended less than half of that, all told, in the three years?

Major ABBOT. This work goes back a good deal more than three years. It was, however, under another title. Fire control came in only with the last session of Congress. We had large sums for range and position-finder stations previous to that time. There was an item in the bill for the support of the Army, for the Signal Corps, and two items in the fortification bill for the Engineer Department and the Ordnance Department, respectively, for range and position finders. You have to include all those items to see what the total appropriation was.

Mr. KEIFER. You were asked what was the probable cost per gun. That could not be uniform at any two stations?

Major ABBOT. No, sir; because it varies so enormously at the various localities, and in accordance with the kind of guns.

Mr. KEIFER. The character of the guns?

Major ABBOT. Yes.

Mr. KEIFER. Where you had a few guns at a station it would cost more, relatively, than where there was a number on a similar system?

Major ABBOT. Not so much more. Supposing, for instance, at Fort Hancock in New York, where there are a number of 10 and 12 inch guns in a continuous battery, that line of guns is divided arbitrarily by the artillery authorities into different battery commands.

Say, two or three guns, heavy guns, are considered to be as much as one man can command in action. That line of guns would be divided, say, into three different individual commands. Those three battery commanders would be grouped under the general control of a single man, who would be called the fire commander; all the defenses at that fort would perhaps be thus organized under two fire commanders, who in turn would be under the control of a single individual known as the "battle commander," so that one battle commander would command two fire commanders, and they would command six battery commanders; the fire-control system is laid out so as to enable this one man at the head to exercise general and complete control over the guns, as well as over the torpedoes, and over the searchlights for use at night. All those various elements of defense come under the control of this one man, and that is where the complication of the system comes in and the number of stations and communication wires becomes so large. Each man must have his own observing station of some kind.

Mr. KEIFER. Where there are many and so close together they would not average so much per gun as when you have a small number at one station?

Major ABBOT. You have to have a certain number of these little individual houses. You get just as many stations, not making any difference whether the guns themselves are close together or separated.

Mr. SMITH. You have to have just as many secondary stations?

Major ABBOT. Yes; just as many secondary, and just as many primary. The only difference is that in some places you can combine some of these stations into a single building. You have to have as many operators and all that, but you save some of the exterior walls in some of the buildings, replacing them by interior partitions. That is all you save.

Mr. GRAFF. I would like to ask you a question. Your estimates for 1907 are $1,500,000, and your unexpended balance under this item is $555,000. That would make a total for you, if you obtained the estimates for 1907, of $2,055,000 for the work?

Mr. SMITH. No; you are in error about that. Partly, Mr. Graff, that estimate is for the work of engineering, ordnance, and signal corps. There is a large balance, no doubt, in the ordnance and signal corps, as well as this $555,000.

Mr. GRAFF. Yes; that would increase the amount for the entire work. Is it intended that these estimates, with the unexpended balances which remain in these three different departments or bureaus, will complete the entire work for all the stations in the country?

Major ABBOT. No, sir.

Mr. GRAFF. How far does it go?

Major ABBOT. I think the Chief of Artillery expects this next year, if we get this new amount, to be able to complete the work at Puget Sound and San Francisco.

Mr. FITZGERALD. The Secretary of War says it will take in the neighborhood of $7,000,000.

Mr. GRAFF. For the completion of the entire work?

Mr. FITZGERALD. Yes.

Mr. GRAFF. Now, then, your testimony impressed me with the idea that the investigations by the artillery on the subject of fire control are by no means conclusive.

Major ABBOT. Even in the harbors of Boston, Portland, and New York there are items which they specifically omit in asking us to estimate upon the work to be done. The battery commanders' stations, which are adjacent to the guns, are yet to be designed by them. We are going to build one at Fort Monroe according to their latest designs, and when a satisfactory type is adopted we have got to construct them for every emplacement in those districts of Boston, New York, and Portland; we can not tell what they will cost, because we do not know just what will be finally adopted. But the artillery are carefully and studiously developing their system, so that we now know vastly much more about what their final ideas are going to be than we did a year ago.

Mr. GRAFF. Still your testimony would indicate that, with the present apparent necessity for the large room required for their operations, your building temporary structures of wood or other materials for that purpose may not be the proper plan after all?

Major ABBOT. I think that they are now very much nearer an actual working plan than they have ever been before. For instance, I do not

believe the primary stations will have to undergo any further increase of area. I think in actual target practice they are able to accurately follow moving targets, and have no trouble to carry out their operations. No person could have told beforehand without actual developing, as the artillery have done, how many men would be needed, or what area would be needed to make these drawings in a rapid manner. Now, I do not believe the areas of our fire commanders' stations will be seriously changed Some of the other items have not yet got to that stage, as, for example, the battle commanders' stations. I feel very uncertain as yet when we build one of those whether it will be of the right shape or big enough.

General MACKENZIE. There is a vast importance in this fire control matter. It has revolutionized the use of ordnance in the accuracy of hitting and in the control of the fire of the guns; it has necessarily been, a large part of it, experimental, and unquestionably the money which has been expended in this experimental work has been well spent, and had to be spent in order to develop the system.

Mr. SMITH. There is no doubt about that, except as to whether these experiments have not been too widespread instead of localized. In other words, whether the Government could not have more economically taken New York, for instance, and completed it, before taking up the other ports. You could have seen at New York what was needed there and developed your plans from that, and then put them in at Boston, and after having seen what was needed there, from your experience there, you could then put in the important plant at Portland. The question is whether the experiments have not been conducted on too wide an area. That is the doubt which exists, I think, in the minds of the committee.

General MACKENZIE. This spreading of the work over the country has not been so much with the idea of spreading the experimental work as with the idea of learning the needs for each locality. They wanted also to put something in to see at each place how these men could best be instructed in the use of fire control.

Mr. BRUNDIDGE. General, when did the Government first commence, or when did your Department first commence, the installation of fire control?

Major ABBOT. It was some time in 1897 or 1898. It was before I came to Washington, I remember. I do not think anything extensive was done in that line before 1897.

Mr. BRUNDIDGE. The installation, then, started in 1897 and 1898?

Major ABBOT. About that time.

Mr. BRUNDIDGE. My recollection, from the testimony last year before the committee, was that it was to cost only about $4,000 to install one gun.

Major ABBOT. We have been absolutely uncertain on that point in the Engineer Department.

Mr. SMITH. Two years ago the estimate came up from the War Department, $1,200 a gun, and later the estimate came at $4,200 per gun.

Mr. BRUNDIDGE. I remember that at the last hearing the estimate was $4,000 from somebody. Now, in view of the fact that I was then one of the persons insisting upon the completion of one at some one

place, I ask you if you are unable to give an estimate at all of what the completed cost will be?

Major ABBOT. I can not make such an estimate with any confidence in my figures.

Mr. BRUNDIDGE. And nobody else can give the estimate?

General MACKENZIE. We have an estimate of what we expect to put in at New York City.

Mr. BRUNDIDGE. Can you tell us, General, how much has been expended for experimental work alone in this one item of installation of fire control? I mean, can you tell us approximately?

General MACKENZIE. It would be difficult to do that, because in this development work, the work which has been put in and which has been used for developing, has been at the same time used also for training and instruction of the men——

Major ABBOT. And could be used in actual service to-day.

General MACKENZIE. It is not, of course, in a completed state.

Mr. BRUNDIDGE. Can you tell us when you are likely to have one completed operating system?

General MACKENZIE. We will have one in New York soon.

Mr. BRUNDIDGE. When?

Major ABBOT. The eastern entrance of New York is nearly completed up to the present plan, and Fort Hamilton and Fort Wadsworth are completed so far as the present plans go, and Fort Hancock is nearing completion.

Mr. BRUNDIDGE. Is it likely there will be a change in the present plans?

Major ABBOT. In New York, no; except that these battery commander stations will have to be determined upon. What they will cost per gun we can not tell, because we do not know what is wanted. The battery commander station is the position in which the person in absolute command of these guns stays in time of action. Two guns generally constituted a battery command. It would be where the commander of those two guns would be in action.

Mr. BRUNDIDGE. Yes, I understand that.

Major ABBOT. And the present requirements are that he must be in a position to see each of the guns by going a comparatively short distance from the central point at which he will have his telephone, and matters of that kind. The first idea that was proposed to us was to have this station far enough in the rear of the battery to allow him to see both guns at the same time.

Mr. BRUNDIDGE. That applies to your department—this installation of fire control?

Major ABBOT. The Chief of Artillery tells the different departments what he thinks ought to be done, and then we carry out the wishes of the artillery as closely as we can. The matter is one of discussion. If the work is going to be too expensive, if it looks as if it would be too expensive, we ask them to reduce it. There have been extremely close and pleasant relations between the engineers and the artillery.

Mr. BRUNDIDGE. I was thoroughly in accord with the chairman's idea about this, that it should have been completed at New York, or at some other one point, before other points were taken up.

Major ABBOT. Yes. I expect to visit Portland before long with Captain Hagood, of the Chief of Artillery's office, with the idea of

talking it over with Colonel Black, and giving him the latest ideas developed in New York and Boston, so that when he begins in the spring at Portland he will have everything at hand to make Portland a distinct advance over the others.

Mr. BRUNDIDGE. Have you anything developed at New York or Boston that would change his plans at Portland?

Major ABBOT. As far as I know only in the interior of stations—small changes——

Mr. BRUNDIDGE. They would change it?

Major ABBOT. Small changes in the interior arrangements, but not any changes entailing a great amount of cost.

Mr. BRUNDIDGE. How about Fort Monroe?

Major ABBOT. That was very largely completed before the maneuvers last fall, but those same maneuvers developed objections to some of the positions which the artillery had chosen and where we had built the houses. I was told the other day that some of these stations would have to be moved; but in all likelihood, being wooden structures, they can be moved without great expense.

Mr. BRUNDIDGE. My recollection is that in the former bill there was a separate and distinct item for the installation of fire control, and I notice in this bill it is grouped with quite a number of other things, so that it is not for the installation of fire control alone, but also for the construction of fire-control appliances, including telephones and telegraphs, and wiring, etc. Why was it included with these other things this year?

General MACKENZIE. Formerly in the fortification bill an item was carried for the engineer work for fire control, and also for ordnance work for fire control, and the work of the Signal Corps branch was carried in the army bill. That was combined in the last fortification appropriation bill, where the three items were grouped together. The wording there, the combined wording of that item is simply the wording of the three items consolidated, as they formerly appeared separately.

Mr. SMITH. Mr. Brundidge is in error as to when the change took place. It took place two years ago. The language of the bill last year is identical with the bill this year.

Major ABBOT. The ordnance item two years ago was called "fire control," and the engineer part was called "range and position finders." What the Signal Corps item was I do not know.

Mr. SMITH. You say you have got this system completed at the eastern entrance to New York Harbor?

Major ABBOT. Yes; except at the battery commander's station and at Fort Slocum.

Mr. SMITH. What is the cost there, everything complete?

Major ABBOT. I could not say without getting at the books, but we have the data at the Department to give it. I have not got it here. (See letter, p. 53.)

Mr. SMITH. We are in the dark, you see. You tell us to-day you apportioned this money for these cities, but do not think it will cover more than three. Now, you have gone up from $1,200 to $4,000 a station, so it looks like $8,000 or $10,000 per gun now. That is a very crude estimate, of course; but we would like to get the most reliable data we can as to what this would mean on the average.

Major ABBOT. I can give you the exact information as to the cost of what we have done at each place when I get back to the office. There is a comparatively small armament at the eastern entrance of New York. It is a very narrow passage and the Hell Gate channel is comparatively shallow, so that there is nothing like the number of guns there as in the southern part of New York Harbor; but there is a very fair fire-control installation at the eastern entrance nearly completed, and I can give you the exact figures.

Mr. GRAFF. The cost per gun would be smaller in a large armament than at a smaller station?

Major ABBOT. It would depend upon the caliber. If there were a number of rapid-fire guns they would not require the large expenditure that an equal number of large guns would need.

Mr. GRAFF. I should think the apparatus would be cheaper per gun in a large place than where there were only a few guns.

Major ABBOT. The fire commander in a small station becomes the battle commander, and that cuts out a large expense in that item, and in some places you even get rid of the fire commander.

Mr. GRAFF. I wonder if an estimate of so much per gun would be of any particular value?

Major ABBOT. It would vary enormously with the places where it was put in, with the size of the battery, and the grouping of the guns. An average price per gun would not tell very much——

Mr. SMITH. A single battery?

Major ABBOT. Yes; a single battery.

Mr. SMITH. I would be glad if you would furnish that information, Major, regarding the eastern entrance of New York. (See letter, p. 53.)

Mr. KEIFER. I want to ask the General if he can give us approximately what proportion of the expenditure would be called temporary in the matter of installing this work; whether it is not difficult to distinguish between that which was temporary in one sense in the beginning and what became permanent in connection with further improvements?

General MACKENZIE. It would be very difficult, General.

Mr. KEIFER. Is there much of it that is really temporary? Is there much of it that was not utilized, I mean, in making permanent installations at any one of these places?

General MACKENZIE. A great deal has been utilized. Of course the work has been spread over the country as much as possible in a small way. At every post we have tried to put in something that they may drill with. Of course in putting that in we have tried so far as possible to put it in so that it will form a part of the permanent work.

Mr. SMITH. These wires that were stretched overhead for these maneuvers are practically worthless in case of war, because overhead wires would not last long in a serious bombardment?

General MACKENZIE. Of course they might not. Even wires in a trench might not last very long if they were plowing up the ground with their projectiles.

Mr. SMITH. But they would not suffer as much as those stretched overhead?

Major ABBOT. I am not sure whether those stretched overhead and widely separately would be damaged worse than those put close together in the ground.

Mr. SMITH. How deep do they go down?

Major ABBOT. About 3 feet deep unless it is rocky. Sometimes, when we can do it without striking too much water, we put them down 4 feet, but the penetration of one of those heavy naval shells is nearly 20 feet, so that you could not put them down deep enough to insure they would not be injured.

Mr. KEIFER. And it would be difficult also to repair them underground?

Major ABBOT. Yes.

Mr. KEIFER. Whereas the overhead wires might be promptly repaired?

Major ABBOT. Yes.

Mr. SMITH. The Department has never thought of the overhead wires as permanent?

Major ABBOT. No.

Mr. SMITH. What other nations have established a system of fire control, so far as you know, General?

General MACKENZIE. I do not know, except that during the Japanese-Russian war the Japanese had a system of indirect fire, which, of course, called for some kind of fire control, but nothing so effective or elaborate as our own.

Mr. SMITH. This is purely an invention, then, of the American military establishment?

General MACKENZIE. Yes; it is an original application of those principles.

Mr. SMITH. You had nothing to guide you in the work of other nations on this subject?

Major ABBOT. The English for a number of years have had a sufficiently good system to know how to follow a movable target invisible from guns and hit the target, but beyond the fact that they use the Watkins position finder and that they get those results but little reliable information is available.

Mr. SMITH. What I mean is, that you have derived no benefit from the development of the science abroad?

Major ABBOT. So far as the Engineer Department knows, no. Perhaps some other branch of the War Department may have more information on that subject.

General MACKENZIE. In speaking about this balance and the work, I was going to say that everything now is in preparation, and it is anticipated that that balance will be expended in the full completion of New York, Boston, and Portland, and that that will be done; and that the amount that is being asked for will be to take up two or three or four new localities.

Mr. FITZGERALD. Some of this work which has been installed, and which has been spoken of as experimental, was not that installed, too, for the reason that it was desired to have some kind of apparatus ready in case of emergency, and it was put in as quickly as possible?

Major ABBOT. Yes; it was necessary, in case of emergency, to have locations of vessels known somewhere in the harbor, and then telephone communication with other batteries would enable the latter

to do better work. It was as good as we could put in at the time, and it enabled the artillery to have what they must have, and that is facility in handling these modern guns, which can not be fired to their full value in the old-fashioned way. The whole theory of seacoast defense is that guns must be controlled by position finding, so as to be effective at a great distance. There had to be means for these men to learn what to do, and to make these guns available in case war actually broke out.

Mr. SMITH. I do not know that I understand you, Major. The language of former acts seems to have antedated even the conception of this fire control, so that this system of fortifications, as built up under the Endicott plan, did not contemplate the fire control, did it?

Major ABBOT. No; but——

Mr. SMITH. So that the guns were available to use before the fire control was dreamed of, but not so effective?

Major ABBOT. Yes; that is the idea. In order to be effective and get the same number of hits that they can get now out of these guns it was necessary to establish these fire-control stations. They make one gun many times more effective than one used to be under the old system.

Mr. KEIFER. It saves loss of time and everything of that kind, too; and if we are to keep up with the times we have got to have men trained at these stations, and put them all in modern condition.

Major ABBOT. Yes; it would be better even to put in comparatively poor stations than not to put in the stations at all.

Mr. SMITH. I suppose, General, without wishing to weary you with this, that when we come to examine the Chief of Artillery we will be able to elicit some information on this subject, as you practically conform to his plans?

General MACKENZIE. Yes; those plans and details are worked out in his office. I want to say in regard to impressions that might exist to a great extent in regard to this experimental work, that about any work of this nature, built up from time to time, much must of necessity be experimental, and there must be improvements coming on from time to time.

Of course the system that is being put in now is probably, to some extent at least, imperfect, and the fact that stations are actually built will not prevent them from determining to make further improvements, which themselves may be added to later on. Though such additions may be not of absolute necessity, they may be very desirable. Regarding the amount of work that has been put in and scattered around the country, it is not exactly fair to call it experimental, because it was put there with an object, and it will serve that purpose and will do it still further if it is still further improved.

Mr. SMITH. In view of the fact that these plans come from the Chief of Artillery, through you, we will not trouble you further about this.

General MACKENZIE. This, of course, is a matter which the Secretary of War considers very important, and for this item of appropriation he fixed that amount as quite important. He considers it so.

PROCUREMENT OR RECLAMATION OF LAND.

Mr. SMITH. Now, before we pass to the next item, which has been reduced to nothing by direction of the Secretary of War, but which

refers to "the procurement or reclamation of land or rights pertaining thereto, needed for the site, location, construction, or prosecution of works for fortifications and coast defenses," as I understand it, for a period of more than twenty years this entire subject of seacoast fortifications has been pursued in general upon the plans of what is known as the Endicott board, which was created by act of Congress?

General MACKENZIE. Yes; I might say that the general features have been.

Mr. SMITH. General outlines, with modifications from time to time?

General MACKENZIE. Yes. Of course naval ordnance has been modified materially, and that has led to changes in the matter of emplacements and land guns.

Mr. SMITH. And the locations?

General MACKENZIE. Yes. With the Endicott board the locations were not so definitely fixed. They fixed a certain number of guns to each harbor.

Mr. SMITH. I mean the harbors.

General MACKENZIE. Yes. The harbors have been closely adhered to. Some have been added to the list, but the old list has been closely adhered to.

Mr. SMITH. This has been under examination by a board in the War Department?

General MACKENZIE. Yes.

Mr. SMITH. I wish you would state what is the character of that board and its work.

General MACKENZIE. The board was organized, as stated in the order, for the purpose of considering the Endicott board's schemes in connection with the recent improvement and development in ordnance and materials, and with the idea of its going over the entire subject of fortifications and considering what modifications should be made in the Endicott board's report.

Mr. SMITH. The Endicott board was created by act of Congress?

General MACKENZIE. Yes.

Mr. SMITH. But this board which you now refer to was created by Executive order?

General MACKENZIE. Yes; that board has been in session for some time and is about ready to submit a report.

Mr. SMITH. What is the composition of this board?

General MACKENZIE. The Secretary of War is the chairman; then there is the Chief of Staff; the Assistant Chief of Staff; the heads of all the Bureaus; the Chief of Ordnance; the Chief of Artillery; the Chief of Engineers; General Greely, the Chief Signal Officer, and General Story, who was Chief of Artillery, afterwards retired, but remains a member of the board. Then there are two naval members, Admiral Thomas and Captain Sperry.

Mr. SMITH. This board, you say, is about ready to report?

General MACKENZIE. Yes; in about two weeks at the outside.

Mr. SMITH. Will any action of that board so modify the action of the Endicott board as to modify any estimates contained in this bill, so far as you know?

General MACKENZIE. No. I am a member of the board, and there is nothing in their report to affect the estimates.

Mr. SMITH. Do you know the particular object to be sought, General, by the creation of this new board?

General MACKENZIE. I do not, Mr. Chairman. It was thought that so long a time had elapsed since the Endicott board had made its report, and the conditions with regard to ordnance and the introduction of fire control had so changed, that it was desirable to have the whole subject gone over again with the thought that with the use of fire control and increased rapidity of firing and other changes there must be an opportunity to reduce the number of guns in certain localities.

Mr. SMITH. The Endicott board was composed of naval and military officers both, I believe?

General MACKENZIE. Yes.

Mr. SMITH. Any changes made in the plans of the Endicott board in the last twenty years have been made without conference with the Navy Department, I presume, but solely on the responsibility of the War Department?

General MACKENZIE. Yes. But of course the navy members of the Endicott board were simply advisory on that board, as they have been on this, in connection, you may say, with naval matters, so that the details of actual construction of fortifications were not matters in which the naval membership was interested.

Mr. SMITH. The naval experience would teach what was necessary to resist naval attack?

General MACKENZIE. Yes; but in the construction and planning of fortifications, and the work since that day, those in charge of the work for the Army have of course from time to time been in consultation with the Navy, and the work, you may say, has been in accord. There is a naval member on the Board of Engineers when foreign matters are to be considered, and another when searchlight projects are under investigation.

Major ABBOT. Neither naval member serves when the subject of the board's action is strictly confined to matters under the Endicott board project, but one of them attends meetings with reference to searchlight matters, and the other those connected with foreign matters.

Mr. SMITH. The next item, which I referred to a moment ago, is for the purchase of sites for the prosecution of works for fortifications and coast defenses. What is the unexpended balance of that appropriation? I see the amount is reduced to nothing by the Secretary of War. Perhaps it would be well to know what the unexpended balance is. It seems to be $363,399.27.

General MACKENZIE. Yes; $363,399.27 unexpended.

Major ABBOT. Of that amount a considerable sum will be covered by the findings of juries in condemnation of land now in progress. It takes a long time to get those findings. How much of that sum will be available it is difficult to say, and it is equally difficult to tell how much will be required—land prices vary so much.

General MACKENZIE. There are several pieces of land which we desire to purchase, but which we can not do until these others are settled and we know what the balance will be.

Mr. KEIFER. There are proceedings pending now?

Major ABBOT. Yes; a number.

PURCHASE AND INSTALLATION OF SEARCHLIGHTS.

Mr. SMITH. Now, General, will you tell us what is the unexpended balance under purchase and installation of searchlights to date?

General MACKENZIE. The available balance on the 31st of December was $47,537.

Mr. SMITH. When I say "unexpended balance" I mean available balance in each instance, General. It was my mistake.

General MACKENZIE. Yes.

Mr. SMITH. Is there any relation between this item and fire control, General?

General MACKENZIE. There is a relation between searchlights and fire control, a general relation. The searchlights are used for illuminating the targets, searching for targets at night, and the fire control is used for determining their exact position; to that extent they are related.

Mr. SMITH. Now, to clear up the minds of gentlemen not familiar with this subject, and I am one of them, I want to ask whether at night, by the use of searchlights, fire control is available?

General MACKENZIE. Yes; it is made available. It would not be available without the searchlights; in fact, no system of gun fire would be. That is, in order to use fire control or shoot your guns you have got to see your target.

Mr. SMITH. You need the searchlights at night whether you have the fire control installed or not?

General MACKENZIE. Yes.

Mr. SMITH. Under the old system of fire control you would need the searchlights anyway?

General MACKENZIE. Yes.

Mr. SMITH. But the new system of fire control would be perfectly worthless without the searchlights?

General MACKENZIE. Yes; perfectly worthless.

Mr. SMITH. Now, in this item the estimates have been reduced by the Secretary of War from $500,000 to $125,000——

Mr. KEIFER. Is the estimate $500,000?

Mr. SMITH. It was, but it was cut down to $125,000. What I wanted to get at is this: This appropriation has been running longer than the appropriation for fire control proper. Have the same places in which you have the fire control now installed or in early contemplation been sufficiently supplied with searchlights?

General MACKENZIE. I should say "no" to that question.

Major ABBOT. New York, Boston, Portland, Narragansett Bay, and the eastern entrance of Long Island Sound have been supplied with a considerable number of searchlights each, but the rest of the searchlights have been distributed widely over the United States coasts to give a chance to the artillery to drill at night. Searchlight money has been distributed in small amounts to almost all the harbors, so that there is hardly more than two or three forts that have not one searchlight, thus permitting the guns to be drilled with at night.

Mr. SMITH. Are many searchlights desirable at a harbor where they have no modern system of fire control?

Major ABBOT. While a large number is not so essential, it is desirable to have enough searchlights to be able to illuminate more than

one vessel at a time; even with the old way of firing guns, where the gunner himself points the gun, he has got to see what he is shooting at, and if all the guns in a harbor shoot at a single vessel of a fleet more projectiles are fired at that one than are needed to sink it, while others are getting in unharmed. If you had two searchlights two vessels could be illuminated at the same time and the fire of your guns could be distributed between the two; you would be apt to sink them both.

Mr. SMITH. Do I understand a greater number of searchlights is necessary in harbors protected by modern fire control than in the old system where you have not got the modern fire control at all?

Major ABBOT. I think that is probably so.

Mr. KEIFER. Why?

Major ABBOT. I was quite doubtful in my own mind when the question was first asked. It is simply because under modern conditions, with a complete fire control installed, they undertake to divide up the fire of the guns more completely than under the old way. Under the crude system formerly used, where each gunner selected his own target without reference to what other guns or batteries were doing, they would all have to fire at whatever was lighted; but now they put the lighter guns on the unarmed ships and the heavy guns on the heavily armed ships, and they exercise a more clear sighted control over what defensive facilities they have than they could under the old system, so that to carry the new system out to its fullest and best intent would require more searchlights than were needed in the rough-and-tumble fights conducted in the old way.

Mr. KEIFER. With the same number of guns you could fire on more vessels at the same time than you could with the old guns and old artillery?

Major ABBOT. Yes.

Mr. KEIFER. You would want, then, to concentrate them upon a particular ship to do the execution which you do now by selecting different ships for your fire?

Major ABBOT. Yes.

Mr. SMITH. I did not mean that. I mean that of two places equally protected, if one has the modern system of fire control and the other has the old system you would need more searchlights at the first place than at the other?

Major ABBOT. To enable you to get all the benefits out of all the money you have invested in your fire control system I think you would need more searchlights at the place where you had the modern system of fire control than in the other case.

Mr. LITTAUER. General, we have had fire control develop as ordnance has developed; we have had instruments, depression range-finder instruments, and azimuth instruments, and now lately our people have found out that with the horizontal base they can reach greater accuracy in pointing at a target than formerly?

General MACKENZIE. Yes.

Mr. LITTAUER. They can not use the horizontal bases without a light?

General MACKENZIE. No.

Mr. LITTAUER. It is more necessary than it was then, after you have got these horizontal bases. The more completely you can give information to the central point where the gun is practically trained

from, the central station—not next the gun, but where the telephone and autograph are used—the better, and they must have lights in order to use this new horizontal base development?

Major ABBOT. Of course; that is just it.

Mr. LITTAUER. Consequently, as your points are increased from which intelligence must be drawn, you have got to have more lights to cover the fleet in which the ships are sailing, and it seems to me, therefore, that the necessity of greater searchlight equipment progresses with the number of points from which you want to gather information?

General MACKENZIE. Yes; it does. As I understand the system now, different guns are assigned to different targets.

Mr. LITTAUER. Of course the whole work is done from a central station——

General MACKENZIE. By means of this rapidity of fire is secured, and each gun is enabled to do more work than it did before. At a time when a number of ships is to be fought each gun will be assigned to its own target, and at night for each target that you are going to use a different searchlight is required.

Mr. FITZGERALD. Is it not a fact that each gun has a certain zone to which its fire is concentrated, and searchlights are intended to cover those particular zones? That is my impression from visiting at Sandy Hook.

Major ABBOT. It is not exactly that. The general scheme is to have the battle commander control at least two searchlights, which cover the whole waters of approach, so as to be sure to discover vessels farther out, if possible, than practicable ranges. They have picked up vessels at night as far away as 10,000 yards with these searching lights. When the vessel is picked up by the battle commander and his searching light, he turns it over to what is called an illuminating light, which is under the general control of the fire commander of certain batteries. That illuminating light is kept fixed upon that individual vessel, and follows it up the harbor, keeping it constantly illuminated, and thus under effective artillery fire, while the searching light drops it and hunts far out for another hostile ship. It searches the distant approaches for another ship, and if another one is found the battle commander at once assigns its further illumination to a second illuminating light and proceeds to hunt for a third hostile ship.

When he finds it he asigns a third illuminating light to take care of it and resumes his search for new enemies. In that way you have to have as many illuminating lights installed as it is thought there will be ships likely to try to come in at one time. That is the arrangement. All these lights are connected by telephones with the fire-control system. Each one of those lights has not only its own telephone arrangement, but the light can be elevated and depressed, or moved in azimuth from a distance, as they are all electrically controlled. All the operator at the searchlight itself has to do is to see that the carbons are burning properly.

Mr. GRAFF. Is there any difference in construction between the illuminating light and the searchlight?

Major ABBOT. No, sir; there is believed to be at present a possibility of using a somewhat smaller light for illuminating than for searching purposes. One is a searching light and the other is an

illuminating light. The 36-inch projector has given fair satisfaction, for instance, where distances are not too great, as an illuminating light, but not as a searching light. It is easier to see a thing when you have once found it than it is to pick it up out of the darkness in the first place. It seems as though the eye is not as sensitive in perceiving an object for the first time as it is after one has been observing it continuously. These searching lights may illuminate a moving ship for a very short time, merely a sort of flash as it passes over the ship, and it must be a very bright light in order to enable the observer to dectect the ship. The eye gets tired with long, fruitless watching and loses its capacity of seeing almost. An object you are in search of must be particularly well illuminated, then, in order to attract attention.

Mr. GRAFF. The construction is just the same?

Major ABBOT. Yes; the construction is just the same, but being larger and more powerful it costs about twice as much as the illuminating light.

Mr. SMITH. You had an estimate from the Secretary of War of $500,000 for this purpose?

Major ABBOT. Yes.

Mr. SMITH. Was that supposed to supply all the works?

Major ABBOT. No, sir.

Mr. SMITH. Have you an estimate now?

Major ABBOT. It is impossible to make it, and we say so in our annual report.

Mr. SMITH. This is just an estimate of what can be wisely expended during the year?

Major ABBOT. Yes.

Mr. SMITH. What does the searchlight and its installation cost?

Major ABBOT. There is wide variation in costs, depending on the kind. Some of them are necessarily operated at a great distance from the posts. Then they must have their own individual electric generating plant and must be independent, except for the electrical control of its direction from a distance. One of these independent outfits requires an engine and trucks, and all sorts of things; a 60-inch, with its trucks, we estimate will cost somewhere between $13,000 and $16,000.

It is not finally determined yet what it actually would be, as none that are entirely satisfactory have as yet been tested. The 36-inch light similarly mounted would cost somewhere between $6,000 and $8,000, depending upon prices and minor details. When a searchlight is near enough to the post to connect with the electric mains that are used in battery illumination all expense of generating apparatus is done away with and the searchlight projector is simply mounted upon a small car; the expense is reduced enormously.

Mr. GRAFF. What is the reason for some of these lights being away from the electrical generating plant?

Major ABBOT. Because it is very difficult to find in any harbor points at which these lights must be put in order to make vessels visible from the points from which they must be seen. The interference of searchlight beams is a very curious matter that is not yet fully understood. Suppose, for instance, there was a beam thrown from that corner of the room over to the water cooler and another beam were thrown from your direction toward me; it would be impossible

for you to see me when I was illuminated by your beam. The first beam acts like a physical shadow almost. When these beams intersect in certain directions they produce interferences and dark spaces. It is necessary to exercise extreme care in selecting sites at which these searchlights are placed, in order to give the most general and perfect illumination of the harbor.

With that in view, this last appropriation has been put altogether into the building, under contract, of movable 36-inch lights, with their plants, to be issued to the different artillery posts. They will be drawn around by horses and operated one in one place and another in another place, until the artillery learn by actual experience in each harbor the points at which the searchlights can be operated to the best advantage, where they will not conflict with each other and not interfere with the fire-control appliances, where they will make it possible to pick up vessels coming in under the different circumstances of rain, of moonlight, of clear and of dark nights. Searchlights act very differently under these four different conditions.

Mr. SMITH. Are the harbors fairly well supplied with searchlights now?

Major ABBOT. No, sir; they are very poorly supplied now. There is only one fortified harbor that I recall where there is none, but there are only a few that have more than two or three searchlights; some of them—Boston, Portland, New York, Washington, Baltimore, and Hampton Roads—are now quite well equipped. The eastern entrance of Long Island Sound and Narragansett Bay are also fairly well outfitted, but with those exceptions the supply is scarce.

Mr. SMITH. Now, inasmuch as searchlights are indispensable, with or without a system of fire control; inasmuch as the system of fire control is only approaching perfection in a few places, why is it not wise policy to make a large appropriation for searchlights instead of for fire control?

Major ABBOT. I think searchlights are a very important feature beyond all question. We need the searchlights anyhow.

Mr. FITZGERALD. He says these are purchased by contract. How many concerns are there that build these plants? How do you make the contract?

Major ABBOT. There were only two bids received at the opening for this contract. The contract covered about $175,000. One bid was from the General Electric Company, of New York, and the other was the Schukert Company, of Germany. A third one came in afterwards, too late to be considered.

Mr. FITZGERALD. Are there any other concerns that can build the searchlights in this country?

Major ABBOT. At the present time the Schukert mirror is the only one that is satisfactory; they all bid on that mirror.

Mr. FITZGERALD. I mean are there more than two firms that could bid?

Major ABBOT. These German mirrors are the ones that the General Electric Company bids on. They do not manufacture mirrors.

Mr. FITZGERALD. You have in view the fact that there is only one particular mirror that is of special value?

Major ABBOT. Yes.

Mr. FITZGERALD. Are there any other concerns except the General Electric which are in a position to supply these mirrors and lights if they get contracts for them?

Major ABBOT. Yes; any large concern that is able to manufacture generating apparatus and gasoline engines and combine them would be able to manufacture searchlight apparatus if they bought these mirrors. At the present time we have not found anything that is as good as the Schukert glass mirror.

Mr. FITZGERALD. Who got the last contract?

Major ABBOT. The General Electric Company. They underbid the Schukert Company themselves——

Mr. GRAFF. Although the Schukert mirror is the chief thing?

Major ABBOT. It is the essential part. A searchlight without a good mirror is of no use, but it is not the most costly part of it.

Mr. GRAFF. But the other parts can be executed by almost any electrical company?

Major ABBOT. Yes.

Mr. FITZGERALD. Has there been any evidence of a combination to control the prices of these searchlights or mirrors?

Major ABBOT. No; I do not think there is any evidence of that. Nobody responded but those that I have mentioned. Some thirty or forty sets of specifications were sent out.

Mr. SMITH. Did you have the bids for engines and searchlights and everything complete?

Major ABBOT. Yes.

Mr. SMITH. If you took the mirrors separately, and let these other things out separately, would you have obtained better results?

Major ABBOT. I do not know; I doubt it. When you come to combining machinery bought from several different people you will generally find that things do not fit.

Mr. SMITH. Do you know whether the General Electric Company have a contract for the exclusive sale of these mirrors in this country?

Major ABBOT. I do not know that.

Mr. SMITH. So that when you offer the bids for the combined work you are not able to say what the General Electric Company could bid for?

Major ABBOT. I could not say.

Mr. FITZGERALD. Have you had any inquiries?

Major ABBOT. Yes; from one concern in Philadelphia. But that came in six months after the contract was awarded. Our advertisements were put in numerous papers, and we sent specifications by mail to all parties we thought might be willing to bid; we tried to secure competition; but this bid which I refer to came in six months afterwards.

PROTECTION, PRESERVATION, AND REPAIR OF FORTIFICATIONS.

Mr. SMITH. What is the balance unexpended under the item for the protection, preservation, and repair of fortifications—the available unexpended balance?

General MACKENZIE. $198,177.73.

Mr. SMITH. For many years you have had a uniform appropriation of $300,000 for this purpose?

General MACKENZIE. Yes, sir.

Mr. SMITH. Has it been adequate to or equal to the general repairs?

Major ABBOT. Just about. The annual expenses were about equal to the annual appropriation.

General MACKENZIE. In that connection I would say there are a great many of these old fortifications—antiquated fortifications—which do not form any part of the present system of defense, and are of value merely for sentimental reasons; we have always considered that this appropriation was not available for keeping up works of that kind, and we have simply used this money for modern fortifications which are in actual service.

Mr. FITZGERALD. For general and necessary repairs that can not very well be estimated for in advance?

General MACKENZIE. Exactly.

Mr. SMITH. I remember that the other day Congressman Perkins, I think, was speaking of Fort Ontario. There are two Forts Ontario, the old and the new one?

General MACKENZIE. Yes. We have been asked in that and in other cases to do a little work. We say, "We sympathize with the proposition, and perhaps for sentimental reasons some of these old forts connected with which there are many associations should be taken care of."

Mr. SMITH. Is old Fort Ontario used in any connection with the new fort?

General MACKENZIE. I believe it is. It is used in connection with the post. You see there is no modern seacoast fort there. It is simply a post, as I understand it. It is used by the quartermaster simply as a storeroom, or something of that kind.

Mr. KEIFER. But not as a fortification?

General MACKENZIE. No.

Mr. SMITH. It is one of the oldest, if not the oldest fort in America?

General MACKENZIE. Yes. We have some twenty-five of these under our supervision; but we have never yet applied this fund to them, although we wanted sometimes to do a little pointing or fixing up here and there. But if we started in with that class of work it would use up too much money.

Mr. FITZGERALD. Are old forts like that, which are used not as fortifications but as posts, under your jurisdiction or within the jurisdiction of the Quartermaster or some other department of the Army?

General MACKENZIE. The care of those old forts is within our jurisdiction. Old Fort Ontario is still virtually under our jurisdiction.

Major ABBOT. We said we would turn it over, if the Quartermaster wanted it.

Mr. FITZGERALD. Is it not a fact that you have a great many requests to repair old forts?

General MACKENZIE. Yes, we have quite a number, and before we get through, it would take a considerable sum of money.

Mr. KEIFER. There are hundreds of old forts entirely abandoned. I think Doctor Toner, who gathered a library here, collected or assembled a sort of history concerning old forts. Whether he printed it or not I do not know, but I understand his collection embraced every old fort erected in this country. Have you ever seen it?

General MACKENZIE. I do not think so. All these old fortifications which are not garrisoned in any way are under our jurisdiction.

Mr. SMITH. How many of these are there, General?

Major ABBOT. I should say there are twenty-five of them.

General MACKENZIE. Of course, many of them are beautiful specimens of masonry and brick work.

Mr. SMITH. Of the ancient type of fort?

Major ABBOT. Yes, of the ancient type of fortification.

Mr. FITZGERALD. Is that the case with Fort Lafayette?

Major ABBOT. That old fort is now in the hands of the Navy for storage purposes.

Mr. FITZGERALD. Is that one of the last fortifications that you did not keep up?

Major ABBOT. We let them stand as long as they will.

General MACKENZIE. At Fort Knox there is a beautiful specimen of work.

PREPARATION OF PLANS FOR FORTIFICATIONS.

(See also p. 53.)

Mr. SMITH. Let us pass to the next item—"For preparation of plans for fortifications." What is the unexpended balance in that?

General MACKENZIE. I do not know that there is any. We do not even have a table.

Mr. SMITH. You had over two years' appropriations unexpended?

Major ABBOT. That is an item from which comes the support of the board of engineers.

General MACKENZIE. There have to be additional allotments to carry on that work.

Mr. SMITH. "Plans of fortifications planned in 1905"—for that item a balance of $10,000 is shown by the statement here of balances of appropriations and expenditures for the fiscal year ended June 30, 1905. That is the amount in the case of the appropriation for 1905. That has accumulated far in excess of your needs, has it not?

General MACKENZIE. I do not understand what that is. It is used up with the draftsmen and clerks.

Mr. SMITH. You see it has been $5,000 for many years. This official report states that you had $10,000 of it available on June 30, 1905. It looks as though you had accumulated two full years of it.

Major ABBOT. The expenses of the board of engineers are two or three times that amount, and the balance has to be made up from other appropriations. It may be possible that in their disbursing they have drawn first from some of the other allotments. There was about half a year gone only at that date. It may be a case of bookkeeping merely. The money will all be needed.

General MACKENZIE. If there is a balance of $10,000 there it is not there to my knowledge. If there is, we ought not to have any more. There must be a mistake there.

Mr. KEIFER. The General can investigate the facts and report at a later meeting.

Mr. SMITH. Yes; I call your attention to that. That is reported on page 72 of the "Statement of balances, appropriations, and expenditures for the fiscal year ended June 30, 1905." The amount is

$10,000, as given there. The general can have that looked into and report to us in writing. (See letter, p. 53.)

TOOLS, ELECTRICAL AND ENGINE SUPPLIES AND APPLIANCES.

Pass to the next item, "For tools, electrical and engine supplies and appliances, to be furnished by the Engineer Department, for the use of the troops for maintaining and operating electric light and power plants in gun and mortar batteries." What is the unexpended balance under this head?

General MACKENZIE. There was on December 31, 1905, $23,789.12 available. According to this little statement that we have here, there was available December 31, 1904, $23.549.59, about the same amount. The expenditures during the year have been $39,760.47.

Mr. SMITH. Corresponding almost exactly with your appropriation?

Major ABBOT. We could expend more, but we do expend all we get. That is about the size of it. [Laughter.]

CONSTRUCTION OF SEA WALLS AND EMBANKMENTS.

Mr. SMITH. The next item is for construction of sea walls and embankments, for which you have estimated $215,900. This does not include Galveston, as I understand it?

General MACKENZIE. No, sir.

Mr. SMITH. What is the unexpended balance under that item?

General MACKENZIE. $30,723.23.

Mr. KEIFER. Can you tell the principal reason why the estimate for 1906 was $99,000, while the estimate for the coming fiscal year, 1907, is $215,900?

Major ABBOT. The estimates are received from the district officers. With the occurrence of storms and consequent cutting of unstable beaches on the south Atlantic coast, etc., the requirements may vary considerably from year to year. During the time between the preparation of estimates for 1906 and that for 1907 disasters of that kind may have occurred which were not foreseen. A case in point occurred during the previous year.

The island upon which Fort De Soto is situated, at the mouth of Tampa Bay, was cut into two parts in a single storm, and the question arose whether we would have to close up that break or leave it, as these inlets sometimes close themselves. It has not closed as yet, and we are still observing it. I think there is no large estimate for that case even this year. The estimate is, I see, only $3,400. We are still in hopes not to have to ask for money, still thinking it may close up of itself. We may later on have to come in for thirty or forty thousand dollars for that very break to prevent further erosion. We do not usually ask for any sea-wall funds unless an occasion has come up calling for very apparent usefulness of a sea wall. We do not say that all these are essential, but we do say they are all desirable at present.

Mr. KEIFER. What I am trying to get at is whether this $215,900 should be appropriated this year. Last year there was only $19,400 appropriated. It would appear that you have got a surplus now.

Mr. SMITH. They ought to keep a surplus in a sum like this.

Major ABBOT. Last year the appropriation we got was $19,400, upon an estimate of $99,000. The balance available is $30,723.23 now.

Mr. KEIFER. Now you want $215,900?

Major ABBOT. Yes; during the past year the storms on the seacoast have led the district officers to ask for more money than last year.

Mr. KEIFER. The only question is whether we should cut that $215,900 down. I do not want to cut it down too much, speaking for myself. I want to provide the necessary money.

Major ABBOT. Whatever sum is given we could do the corresponding amount of work at the present time; work which is considered economically desirable by the district officers stationed at these different harbors, where they know the exact conditions. If you cut the amount down we will go over the reports of these officers and select the most urgent places as they appear from the reports, and let the others wait. In case anything gives way we can not help it.

Mr. SMITH. Can you give us any light as to how much will be required for these cases of emergency where serious injury to batteries in all probability will result if something is not done?

Major ABBOT. It is somewhat difficult to do it.

General MACKENZIE. We have a statement upon which that is estimated.

Major ABBOT. There are items like the St. Johns River, Florida, where the bank is cutting very rapidly and where the reservation is small, but no fortifications have been erected as yet. In order to save our site we ought to put in our sea wall promptly. There are no batteries installed there as yet, so I would not consider that a case of real emergency, though the district officer does. The same general condition of greater or less emergency exists at all the places on this statement which I have here [indicating statement]. There is no place now where there are any batteries that would actually cave in, but we might lose some of the reservations. It is not likely that any guns would be put out of service.

Mr. SMITH. Is the loss of land in front of a battery ordinarily a material loss?

Major ABBOT. It costs a great deal of money when we try to buy it [laughter], and the areas are needed for all sorts of purposes. The theory of defense now calls for concealment of the works as much as possible, and with that view we try to cultivate woods and trees in front of our batteries, and things of that kind, to conceal them. When a war broke out the tops of the trees would be trimmed enough to allow the guns to shoot over them, but the batteries would still be almost completely concealed from naval view. For range-finding stations we want to hold all the land we can, because we can not tell just where these buildings should be put to the best advantage. The concealment of a range-finding station is the best protection it can have. If you have a little clump of trees in front of it, it is nearly as safe as if it were behind a solid embankment, as they are, when possible, located where shots directed at the battery are not likely to strike.

General MACKENZIE. We need a great deal of property, and a good deal of this is being washed away.

Mr. SMITH. What are the more emergent ones, and what is the estimate as to those?

Major ABBOT. Fort Dade and Fort De Soto, I think, are the most serious cases where works already put up might be injured in the coming year. They are at the mouth of Tampa Bay. Also at Fort Morgan, Mobile, Ala., there is a serious cutting going on now.

Mr. KEIFER. What is the estimate to preserve those three?

Major ABBOT. I should think forty or fifty thousand dollars would cover the most urgently needed works.

Mr. SMITH. What do you say as to whether this balance of $30,723.23 is an adequate balance for you to keep permanently? Suppose we allowed what you think is necessary for emergencies, is this an adequate balance for the service universally that might arise?

Major ABBOT. I think it is too small, and it appears to be a good deal bigger than it really is, because it is already allotted to walls that are not yet finished, but for which funds have been allotted, so that they are not shown in this list. The place where most danger exists is Fort Caswell. I am holding $4,000 in hand for the district officer there. That is all the real reserve that I have, as the balance will be expended by the district officers, as their works now in hand advance to completion.

Mr. SMITH. Ought there not to be a reserve in this fund which is not allotted?

General MACKENZIE. Yes.

Mr. FITZGERALD. If we gave you something in excess of this forty or fifty thousand dollars, which you believe is imperative, would your department retain that excess for urgent occasions, or would it go on and endeavor to complete some of these works that are not particularly imperative now, but might become so?

Major ABBOT. That is a question of judgment that is very hard to decide. I suppose work on two or three at least would get started, due to absolute emergencies.

Mr. FITZGERALD. Then they would become imperative?

Major ABBOT. Up to this year we have considered that we had so many items that needed urgent attention that we have actually alloted the total appropriations as they were made.

Mr. SMITH. What do you say about not allotting all the appropriation?

Major ABBOT. I should think that would be a good idea, if we had sufficient funds to set aside a certain amount for extraordinary emergencies.

Mr. SMITH. If you came in here and said that was a permanent policy to keep a margin, Congress might agree to it.

Major ABBOT. There was a break not long ago on one of the levees of the Mississippi down in Louisiana——

Mr. FITZGERALD. If we gave $50,000 or something in excess of that, some of your district engineers might know of that and might say, "Here is something that might be serious to do," and it would perhaps encourage them really to estimate for things that are not imperative or necessary.

Major ABBOT. We avoid that if we can.

Mr. KEIFER. You say $45,000 or $50,000 would be needed for what you suppose might be emergency work. Do you mean by that that that would enable you to protect the land in front of the guns at these particular places? If you had that $40,000 or $50,000, could you go

and protect the land there from being washed away by the sea? I am speaking of land being washed away or the danger to the guns that would be involved in the washing away of the land and the necessity to avoid that danger.

General MACKENZIE. All of these items that we have here we believe are desirable items. Some are not absolutely emergencies, but these are the places where it is most desirable to do the work; and Major Abbot, in running over the list, has simply fixed upon those which you might call especially important.

Mr. SMITH. That is where we are losing the land or the foundations?

Major ABBOT. Yes; that is where we are losing the land by having it washed away; I have picked out the most valuable land. An acre in one place might be less valuable than 10 feet of land in another place, according to its location. I think forty or fifty thousand dollars would stop the worst of it.

Mr. KEIFER. I am in favor of your stopping it, because if you do not you will be here again perhaps for hundreds of thousands, instead of thousands.

Mr. BRUNDIDGE. As I understand, these estimates depend largely upon climatic conditions, and storms and incidents of weather that are unforeseen?

Major ABBOT. Yes.

Mr. BRUNDIDGE. Now, in 1905 your estimate was for $200,000, and Congress gave you $99,000, or a little less than half of the amount asked for. In 1906, I observe, the estimates were exactly $99,000. Were the estimates of 1906 based upon the weather conditions or upon the previous appropriations made by Congress? [Laughter.]

Major ABBOT. My impression is that there was also involved the action of the Secretary of War. I think those estimates, as printed there, are our estimates as reduced by the Secretary of War.

General MACKENZIE. They are very apt, in cutting, to note what was given the year before, and cut it to that amount.

Mr. SMITH. There are only two items more for the engineers, one on this subject, and one in the next item, and then there are one or two supplementary ones that have come in since. I would like to conclude the inquiry to-day, because to-morrow morning at 10.30 o'clock the Chief of Ordnance will appear.

CONSTRUCTION OF SEA WALL, GALVESTON, TEX.

There is an item that was stricken out here which may be sought to be put in on the floor. I wanted to ask a few questions about that. It is "For construction of sea walls and embankments for the protection of the sites of fortification works for the defense of Galveston, Tex." As a matter of fact, are there any fortifications that would be protected by this sea wall?

Mr. KEIFER. Or sites of fortifications?

Major ABBOT. Yes. That was the Fort San Jacinto item. That is for the protection of Fort San Jacinto. The batteries to be protected are on the point.

Mr. SMITH. Is it not a fact that this sea wall is not at all necessary for the protection of the fortifications themselves, but that

this is really for the purpose of connecting the Galveston sea wall with the highlands, with the fortifications?

Major ABBOT. No, sir; it incloses 100 acres. There are two tracts covered by the estimate, one of them over at Bolivar Point and the other down at Fort San Jacinto. They are isolated places which they propose to inclose with a sea wall and build up with pumped sand in order that there may be room for quartermaster's buildings, officers' quarters and barracks, and matters of that kind in connection with the batteries. We have rebuilt those batteries so that they are storm proof, under that act for repairs, but there is no place for the artillery troops to live in except within the batteries if a storm comes.

Mr. SMITH. This committee has nothing to do with barracks and quarters or with their protection.

Major ABBOT. This is to produce land on which the garrisons for these emplacements could reside in the vicinity of the guns; it covers also a comparatively small item of filling in rear of part of the sea wall the United States has just completed in front of the Fort Crockett Reservation, connecting it with the main city sea wall.

Mr. SMITH. As I understand the matter, this committee has nothing to do with providing barracks and quarters for the artillery troops.

Mr. SMITH. This item is not for the protection of fortifications, but for the protection of barracks and quarters. Is that true?

Major ABBOT. Yes.

General MACKENZIE. There was a question whether we should submit the estimate or not, and we brought it up to the Secretary of War with an explanation, so that it would not be forgotten.

Mr. FITZGERALD. This belongs on the army bill.

Mr. SMITH. I remember the investigation of this item a year or two ago, in which I got the impression in my own mind that it was for the protection of barracks and quarters and not for fortifications. This committee has no jurisdiction over barracks and quarters, but the Committee on Military Affairs has. I do not think we have anything to do with this item.

Major ABBOT. There is only one consideration that sends this question before this committee, and that is the matter of range finders and fire control. We have not put in any fire control down at Galveston. We have protected the batteries so that we believe they are safe. We have protected the torpedo storehouse and the mining casemates, but there is no site as yet from which they can control the firing of the guns; it would be a great deal cheaper in actual construction for us to put up a storm-proof fire-control station than to do all this. If this whole area is raised it will, of course, give us a place for our fire-control station. That was the question which was raised when the matter was discussed at the Department.

Mr. SMITH. This connects up with the Galveston sea wall?

Major ABBOT. No, sir; $925,000 is for a sea wall at Fort San Jacinto, which does not connect by a mile with the city wall; $350,000 is for Fort Travis, on the other side of the entrace; $158,953.75 is for filling on the Fort Crockett Reservation, which does adjoin the city sea wall.

Mr. FITZGERALD. The estimate was a million dollars and a half?

Major ABBOT. About that.

Mr. FITZGERALD. A greater part of that would be to provide land for the quartermasters, and a little of it for the range finders?

Major ABBOT. Yes.

Mr. SMITH. That would be incidental, because you can construct the fire control at a nominal cost?

Major ABBOT. Yes.

PRESERVATION AND REPAIR OF TORPEDO STRUCTURES.

Mr. SMITH. Now pass to the next item, "Preservation and repair of torpedo structures: For preservation and repair of structures erected for the torpedo defense of the United States, $50,000." This item has never appeared in the bill before?

General MACKENZIE. No; we are now accumulating and building a large number of those buildings, and each year there is some repair work to be done.

Mr. SMITH. What has that been paid out of, General?

General MACKENZIE. The next following appropriation is the one under which those have been built.

Major ABBOT. One reason why—the principal reason why this item has not appeared before is that up to the present time the torpedo structures that we built have required hardly any repairs. They were of concrete and covered with earth, so that there was nothing much to deteriorate, but in the last year we have been building much lighter structures, in accordance with the expressed views of the artillery as to what they needed for their administration of the torpedo service, which is somewhat different from what ours was. They want their building light and airy and with much less protection against projectiles, so that the individual buildings cost much less. Their deterioration, however, is much more rapid.

For instance, they want their torpedo storehouse simply covered with galvanized iron, a wooden frame building with galvanized-iron sides, which will rust through in short order. Our former storehouses cost three or four times as much, but they had slate roofs and brick sides, and their repairs were only nominal.

Mr. SMITH. Does it cost more to keep these up in repair than it does the other system, in view of the much less original cost?

Major ABBOT. Yes; the much less original cost and the resulting much greater number; we get a larger appropriation also than ever before. It was $33,000 the year before. We built a great number of these buildings the past year, and when you once multiply the number of buildings to a considerable extent, however small the amount required per building may be, the repairs run into dollars.

Mr. SMITH. At the time the predecessor of General Mackenzie was in charge of the whole question of submarine defense it was reported to this committee that the submarine defense was in a faultless condition throughout the United States. Immediately after it was transferred to the Chief of Artillery the report was made that is was not in perfect condition anywhere. [Laughter.] We were induced last year to increase very largely the appropriation for the construction of mining casemates, and galleries, and storehouses, and tanks, and so on, in connection with the submarine defense, on the assurance of the Chief of Artillery that the Chief of Engineers was in error in that

regard. Now, if we give you $50,000 for this item—we have already in the last bill greatly increased the next item—so that if we do that for the same purpose we will have gone up from $50,000 in 1904 and $87,000 in 1905, and——

Mr. KEIFER. The $50,000 is for next year.

CONSTRUCTION OF MINING CASEMATES, CABLE GALLERIES, ETC.

Mr. SMITH. I understand that; but the point is whether the large increase under the next item—where you ask for 1907 $175,000—is not in excess of what was needed if we give you the full estimate in the next item. The appropriations for 1906 amounted to $400,000. Your estimate for 1907 for construction of mining casemates, galleries, etc., is $175,000.

Major ABBOT. The next item is for construction, yes. If we carry out anything like what is wanted to be done by the Chief of Artillery it would all be quite necessary. He was anxious to have us ask the committee to increase that item very much for the construction of these buildings. It was reduced from $540,700 by the Secretary of War.

Mr. SMITH. What do you say as to the balancing of this next item with the other? Suppose we should take them up together? You understand what I mean by the balancing of it?

Major ABBOT. You mean the relative proportion?

Mr. SMITH. We want the appropriations to be so balanced that you can progress equally in the two branches, if that is desirable.

Major ABBOT. I do not know how much the amount in the bill for the ordnance is.

Mr. SMITH. How did you stand relatively with the artillery last year?

General MACKENZIE. The artillery had none of this construction. There is no appropriation for construction to balance that. That would be under the Ordnance Department. The Chief of Artillery tells me that is not balanced. The Ordnance Department estimate next year is much larger than ours.

Mr. SMITH. Yes. While I spoke of artillery, it was on the estimate of the Chief of Artillery that we made the increase for submarine mines. I understand he does not provide them but operates them, and the Chief of Ordnance provides them?

General MACKENZIE. Yes.

Mr. SMITH. When I spoke of the Chief of Artillery I simply referred to his testimony as to the needs of that.

General MACKENZIE. The Chief of Artillery informs me that the next appropriation, $175,000, is very much less relatively than the estimate of the Ordnance Department.

Mr. SMITH. So that if we do not allow you more than the estimate we can cut them down?

General MACKENZIE. Of course they are very earnest in connection with that torpedo work, and it is very important.

Mr. SMITH. What is the unexpended balance of this appropriation, General?

General MACKENZIE. You mean under that item on the 6th page?

Mr. SMITH. Yes.

General MACKENZIE. It is $215,226.27. Of course in connection with that matter it is something like these others—it has taken some little time to get the plans. We have to get the plans from the artillery and get started.

Mr. SMITH. If by construction of the accounting officers you are entitled to pay for repairs out of this second item and you put a second item in for repairs, could you get anything out of this appropriation for repairs under the rules which obtain among the accounting officers?

Major ABBOT. That is one thing we wanted to cover by that item, so that we would know the definite amount we would have for repairs, and not be called upon to fritter away the appropriation for construction in keeping up buildings.

Mr. SMITH. What I mean is, are you now allowed to pay for repairs out of this item on page 6?

Major ABBOT. I do not think we have been allowed to pay for repairs out of it. There have been no repairs on the old system of works. There was nothing to deteriorate with respect to that. They were simply brick houses with slate roofs.

Mr. FITZGERALD. Has no part of that appropriation been expended in the present fiscal year for repairs?

Major ABBOT. No; if general repairs had been made, they would have been made out of the more general appropriation for the repair of "fortifications." It is doubtful whether that term "fortifications" is intended to cover the item of torpedo buildings, where we are putting in a more perishable class of structures. That is a question. In recommending the wording in the law this year I wanted to differentiate the torpedo repairs from the fortification repairs.

Mr. SMITH. I ask you whether the insertion of a separate item for repairs would be construed by the accounting officers to waive your right under the construction of the Treasury Department to use money out of another appropriation for that purpose?

Major ABBOT. That is the way I regarded the law in making the allotments.

Mr. FITZGERALD. The difficulty is, Mr. Chairman, that in my experience the more you separate these items and the more you increase the number of items the larger the appropriations grow from year to year. [Laughter.]

Mr. SMITH. I believe myself that repairs ought to be distinguished from construction, both for purposes of bookkeeping and on account of other considerations.

Major ABBOT. Yes; because after a while the repairs take up all the new appropriations.

FORTIFICATIONS IN INSULAR POSSESSIONS—CONSTRUCTION OF SEACOAST BATTERIES.

Mr. SMITH. The next item, as I understand, General, of interest to you is over on page 17 of the bill for fortifications in insular possessions?

General MACKENZIE. Yes; that is our item.

Mr. SMITH. Now, I notice a material change in the language here in this item, which heretofore has read, "For construction of sea-

coast batteries in the insular possessions," and now you propose specifically where they shall be made.

General MACKENZIE. That is the law, I believe.

Mr. SMITH. You propose this change of language?

Major ABBOT. It was required by the act of Congress last time.

Mr. FITZGERALD. The appropriation act contained this provision—the act approved March 3, 1905: "Hereafter all estimates for fortifications for insular possessions in the United States shall be made and submitted to Congress, showing amounts proposed to be expended at each harbor in the insular possession." I apprehend the object of getting the estimate is in order to appropriate in the same definite manner.

Mr. KEIFER. I think the propriety of it is indicated by that law; but it is not necessary.

Mr. SMITH. It is not customary to so describe it as to each point at home.

Mr. FITZGERALD. I suppose one object of it was this, that there might be some who would agree that some places in the West Indies might be fortified, and then others at Honolulu, and then in the Philippine Islands.

Mr. SMITH. Now, General, what is the estimate, if any has been made, as to the complete cost of fortifications at Manila?

Major ABBOT. There have been two or three estimates put in already. First, there was a board composed of officers stationed there; then it was revised by the Board of Engineers, and the last revision is in the vicinity of two and one-half million dollars, I think, but that plan is entirely different again from the Taft board recommendations.

FORTIFICATIONS AT MANILA, P. I.

General MACKENZIE. Major Abbot has said there have been one or two boards and different plans submitted, but this has all been revised by the Taft board, which will not change it very materially—we will say perhaps a couple of million at Manila.

Mr. SMITH. That is definitely decided on?

General MACKENZIE. Yes; the work is under way.

Mr. FITZGERALD. Where is that?

Major ABBOT. Corregidor, at the entrance.

Mr. FITZGERALD. That does not contemplate any fortification within the bay farther up?

General MACKENZIE. No; all in the entrance.

Mr. SMITH. Now, this $500,000 that you ask for, is that wholly for construction? As I understand from the item, you have got the land?

Major ABBOT. Yes.

Mr. SMITH. So that this is all for construction?

Major ABBOT. Yes.

Mr. SMITH. This would be about a fourth of the total cost—a fourth or a fifth?

Major ABBOT. Yes; somewhere in that vicinity, depending upon the final findings of the Taft board.

Mr. SMITH. How much has been expended in construction in the

Philippine Islands as distinguished from acquiring the land at Manila?

Major ABBOT. About $340,000 cash has been expended. A million and four hundred thousand dollars has been appropriated in two years in amounts of $700,000 each.

Mr. FITZGERALD. That was for all the insular possessions.

Mr. SMITH. How much has been appropriated to Manila and expended in Manila of existing appropriations?

Major ABBOT. Out of the first appropriation there was $245,000 allotted to Manila and $455,000 to Subig Bay. Under the second appropriation there was $513,000 allotted to Corregidor Island and $180,000 to Guantanamo, Cuba.

Mr. SMITH. The Guantanamo project is not in this item at all?

General MACKENZIE. No; that was a special estimate.

Major ABBOT. There has been a separate estimate for that this year.

Mr. SMITH. So that you now have had about $800,000 for Manila?

Major ABBOT. Yes, sir.

Mr. SMITH. And then if we give you $500,000 that would about half complete the project at Manila—Corregidor Island?

General MACKENZIE. Yes.

FORTIFICATIONS ON SUBIG BAY.

Mr. SMITH. At Subig Bay you say that $455,000 was apportioned. Only one apportionment?

Major ABBOT. Yes.

Mr. SMITH. As a matter of fact, is the Subig Bay project not certain to go on?

General MACKENZIE. It is so reported and claimed by the Navy and by the general board of the Navy to be an important point in their estimation.

Mr. SMITH. Is not the abandonment of this naval station at Subig Bay being considered?

General MACKENZIE. It was talked of in a general way some time ago. I have talked with a naval member of the Taft board and of the general board within a few days past, and I gather from him that he is strongly of the thought that Subig Bay is the important point, and that it is still so regarded by the officials of the Navy Department.

Mr. SMITH. If the Naval Committee should advise us whether the Navy Department abandons it or not—that they will abandon it—you would withdraw this?

General MACKENZIE. Yes.

Mr. SMITH. How far is Subig Bay from Manila?

Major ABBOT. It is 70 miles by actual water travel from Manila.

Mr. SMITH. What is the state of progress of any naval improvement at Subig Bay?

General MACKENZIE. The Dewey, the floating dry dock, is now on its way there.

Mr. SMITH. What is intended to be there besides fortifications?

General MACKENZIE. Nothing, as I understand, but the naval base.

Mr. SMITH. You know of nothing there now except this dry dock, now under way?

General MACKENZIE. There is something there, but I do not know what it is.

Mr. SMITH. Would you not say we should wait until there is something there to be protected before going ahead and constructing fortifications?

General MACKENZIE. The War Department has been governed in that by the action of the General Board of the Navy and this Joint Army and Navy Board. They have laid great stress in both cases on the Subig Bay works.

Mr. SMITH. What is to be the total cost of Subig Bay?

Major ABBOT. Subig Bay would have cost about $750,000 under the original project.

Mr. BRUNDIDGE. You say it has cost that?

Major ABBOT. No; it would. That is what it was originally estimated to cost. But in view of the statement by naval authorities as to the importance of the place, it became apparent that the greater number of heavy guns would have to go in, so that the estimates would be probably a million dollars more than we figured on—say, a total of perhaps a million and a half.

Mr. SMITH. What is the unexpended balance of the allotment to Manila Bay?

General MACKENZIE. For the total Philippine Islands it is about a million dollars.

Mr. FITZGERALD. Unexpended?

General MACKENZIE. Yes; unexpended. There has been great difficulty in getting work started. There was difficulty in getting machinery and lumber and everything from the States.

Mr. SMITH. Of that amount you told me about $200,000 had been expended at Manila. What did you tell me had been expended in Manila, actually in cash?

Major ABBOT. About $300,000.

Mr. SMITH. And about $800,000 has been allotted? That leaves about $500,000 at each place allotted already?

Major ABBOT. Yes. To illustrate the difficulties there: Corregidor Island has almost vertical shores, and the batteries are built at a height of nearly 400 feet up, and it was necessary before we could begin to do anything there to build wharves in order to land, and then we had to secure a water supply for our men and machinery; we then had to get a railroad track up this slope to the top before we could begin to put men at battery construction.

At present the foundations are partly in for the batteries covered by that first year's allotment. The cement is contracted for and some of it was probably delivered this month or will be next month. An actual beginning of battery construction for these guns and mortars allotted for under the first appropriation has been made, but there has been no actual progress made with respect to the other guns, because surveys had to be made. The land is covered with the most dense kind of brush and trees, and before you can pick out the place for a battery you have to have a general survey. It is a very slow operation to get started there, but after you once get going you can make fair progress with the actual building operations.

Mr. SMITH. So you have figured out a half million dollars, or about $575,000?

Major ABBOT. That is nearer.

Mr. FITZGERALD. Was this revised estimate for the defenses of Subig Bay based upon the plans of the Navy Department, that they were to complete at a cost of in the neighborhood of $30,000,000?

Major ABBOT. We don't know exactly what their plans were; they said they were going to make it a very important place, and that they should have the most adequate defenses.

Mr. FITZGERALD. Did you have any knowledge of the estimates that they made as to what it would cost to complete their plans?

Major ABBOT. No, sir; not officially.

Mr. SMITH. At Subig Bay, you say, it would cost about a half million dollars to fortify?

Major ABBOT. Perhaps a million and a quarter or a million and a half.

Mr. SMITH. There is nothing there for the Government or anybody else to protect?

Major ABBOT. There is vacant land at present, I believe.

General MACKENZIE. There seems to be something, because the quartermaster tender makes two or three trips a week there.

Mr. SMITH. Is Subig Bay supposed to be an important harbor as well as a naval station?

General MACKENZIE. I suppose it was intended to be. The naval members of this Taft board have ranked Subig Bay as one of the three most important harbors to be fortified that we have.

Mr. GRAFF. Why?

General MACKENZIE. On account of its being an important naval station.

FORTIFICATIONS AT GUANTANAMO.

Mr. SMITH. What about Guantanamo? Did you not say that you had assigned a portion of this insular appropriation to Guantanamo?

Major ABBOT. One hundred and eighty thousand dollars.

Mr. SMITH. Guantanamo is not in the bill.

Major ABBOT. We put in a subsequent estimate covering a plan for defending Guantanamo; at the time the regular estimates were prepared for submission to Congress there was no information before the War Department that the Navy was going to do anything more than would call for the small defenses we are now providing with the $180,000. We considered that $180,000 was enough to keep in step with the progress that was made up to that time by the Navy. Upon the publication of the Book of Estimates we found that the Navy Department had submited estimates to Congress for very large work to be done at Guantanamo during the coming year, and we then put in a supplementary estimate.

Mr. SMITH. Of $250,000?

Major ABBOT. Of $250,000; which we believed would keep us in fair relative progress with the Navy, providing Congress gave the Navy as much as they asked. If there is no naval work done there this year we think we are now in step, but if the funds are given to the Navy, then we would require funds to keep our part of the work up.

FORTIFICATIONS AT PEARL HARBOR, HAWAIIAN ISLANDS.

Mr. SMITH. Finding that Guantanamo is covered by a separate item in the bill, let us turn back for a moment to this item for Honolulu. You ask for Honolulu and Pearl Harbor, $260,000. How much unexpended balance have you in the allotment for these fortifications?

General MACKENZIE. There is nothing for Honolulu; this will be the first item.

Major ABBOT. The beginning.

Mr. SMITH. You have had no legislation for Honolulu or Pearl Harbor at any time in the past?

Major ABBOT. No, sir.

Mr. SMITH. How long have we owned Pearl Harbor?

Major ABBOT. The Navy were condemning land over there in Pearl Harbor in 1901. I don't know how much we owned there before.

Mr. SMITH. I did not mean the owning of land for the fortifications. Did we not by treaty have the right to occupy Pearl Harbor during the existence of the kingdom there?

General MACKENZIE. I don't know, sir; but of course the entrance to the harbor was not very good at that time.

Mr. SMITH. The project has been delayed a great many years?

General MACKENZIE. Yes, sir.

Mr. BRUNDIDGE. General, I would like to ask you, for my own information, if there has ever been any general estimate by the War Department as to what will be the total expenditure entailed to properly fortify our insular possessions generally?

General MACKENZIE. There are already four points under construction—Subig Bay, Manila——

Mr. BRUNDIDGE. Does the Department consider that that would be sufficient fortification to defend our insular possessions?

Major ABBOT. The matter is under consideration by the Taft board.

Mr. SMITH. Pearl Harbor and Honolulu are one?

General MACKENZIE. They are only 10 miles apart.

Mr. SMITH. You speak in the next item of the procurement of land needed as sites for the defenses of the Hawaiian Islands. Does that include both Honolulu and Pearl Harbor?

Major ABBOT. Yes, sir.

Mr. SMITH. What is the amount for Pearl Harbor, and what is the amount for Honolulu?

Major ABBOT. There has been no division made. We have bought as we could. We have bought some land for each out of the appropriation already made.

General MACKENZIE. It is practically one work.

Mr. SMITH. You will see by the table that the original estimate of the cost of the land required for defenses in the Hawaiian Islands was $526,100. Can you make the estimate for two places without having a separate estimate for each place?

Major ABBOT. The batteries at Ahua Point defend both entrances; one system of batteries for the two.

Mr. SMITH. Then only one site is affected?

Major ABBOT. A number of different separate sites, not one continuous string of batteries.

Mr. SMITH. One set of fortifications?

Major ABBOT. If you protected one entrance they would come in behind you. We must defend both entrances to protect either.

Mr. FITZGERALD. What is the unexpended balance?

General MACKENZIE. There is $27,000. Of that, $22,000 is covered by the findings in a condemnation suit, which is just received, since December 31, 1905.

Mr. SMITH. There has been an impression in times past that we were being charged high prices for this land in Hawaii. Are we being extorted unreasonable sums?

General MACKENZIE. I don't think so. Of course some of this land which was purchased at Waikiki Beach is beach property, and cost a little more than the ordinary property; but all property is very valuable along the line of the Oahu coast. There is not much of it.

Mr. SMITH. The delegate from Hawaii and the representative of the principal commercial body of Honolulu have asked for a hearing upon this item, and they have been told that they could be heard tomorrow. They insist that this matter ought to be pressed. The total amount that has been expended for these sites there has been what?

Major ABBOT. Two hundred thousand dollars, less $27,000, of which $22,000 is mortgaged.

Mr. SMITH. So that it is going to take about $335,000 to complete the sites.

Major ABBOT. Yes, sir; judging from the comparison of the areas bought with the estimates on which we are buying, we are getting out, if anything, ahead of the estimate—that is, we will probably be able to get through for the money.

Mr. SMITH. Is enough land already in possession of the Government to justify the expenditure of $260,000 in the next year on the fortifications themselves?

Major ABBOT. Yes, sir; undoubtedly.

Mr. BRUNDIDGE. How much land have we there already?

Major ABBOT. We have one very large tract to the left of the entrance of Pearl Harbor.

Mr. BRUNDIDGE. Approximately, I don't care exactly.

Major ABBOT. I can not give the area from my memory. We have in this table the acreage in all cases in this country, but we have not got it stated for sites abroad.

General MACKENZIE. We can give it to you.

FORTIFICATIONS AT GUANTANAMO (AGAIN).

Mr. FITZGERALD. Your estimate for $250,000 for Guantanamo is based upon the theory that Congress will allow the Navy Department the amount it submits for the coming fiscal year. But if Congress does not allow the Navy Department what they ask for, then that money will not be needed.

General MACKENZIE. If they cut them one-half, then this probably will be reduced in the same proportion.

Mr. FITZGERALD. You say in the same note in which the estimate was submitted that it appears that if the work contemplated now is done, that within five years very heavy ordnance will be required there for the defense of that place.

General MACKENZIE. Yes, sir.

Mr. FITZGERALD. It will take several years to complete those defenses. Could the construction of these defenses not be deferred for two years and still be completed at the end of five years, when they will be required?

Major ABBOT. It takes in this country, with all the facilities we have, fully two years from the time that we begin the work, not the time that we begin to get the plans, but from the time we put the men in the field—it is two years from that time before a 12-inch emplacement is ready to turn over to the artillery. In view of that, it would probably take at least three years down in Cuba, and by three years the Navy ought to have increased defense; therefore we should start about the same time the Navy does in order to get our plans well studied beforehand and to keep in step with them.

Mr. SMITH. What do you know about the plan or the estimates for an army post at Guantanamo?

Major ABBOT. That has been brought up.

General MACKENZIE. We are busy now constructing 3-inch and 6-inch gun emplacements there, and also constructing the torpedo buildings, and when they are done it will necessitate their care; and I think they are now proposing to arrange for one-company posts there.

Mr. SMITH. So in addition to the defenses and the naval station and auxiliaries there will be something for a military station there, too?

Major ABBOT. There have been three military reservations ceded by the Navy Department to the War Department.

CUSHINGS ISLAND, MAINE—PURCHASE OF LAND.

Mr. SMITH. There has been favored the purchase of land on Cushings Island. What is the emergency at Cushings Island, General?

General MACKENZIE. We are not anticipating any more construction on Cushings Island—any emplacement construction. This amount is claimed to be needed for post purposes and also to remove the hotel which is directly behind the battery and from which they can overlook the battery, and, of course, which would be uninhabitable in case of the use of the battery.

Mr. SMITH. Yes; that is of deep interest to the hotel people, but is it of deep interest to the United States?

General MACKENZIE. I have not had very much to do with this matter. I think this comes through the Quartermaster's Department or directly from the Secretary.

Mr. SMITH. Indirectly from the Quartermaster's Department through the Secretary. I understand you to say that you do not contemplate erecting any further defenses there?

General MACKENZIE. No; the former project did contemplate some more light guns—rapid-fire guns.

Mr. SMITH. But that part has been abandoned?

General MACKENZIE. The report of this Taft board will recommend no more armament on Cushings Island. That question has given considerable trouble to us sometimes in determining the question as to where we would put a battery and as to whether we are

responsible for property in the vicinity which may be damaged, or whether there is property from which they can overlook a fort, and as to how far we should go. We rather felt that those matters were post matters, rather quartermaster matters than fortification matters.

Mr. SMITH. Was this hotel built there before any Government land was acquired?

General MACKENZIE. Oh, yes; and, of course, I think there is no question that it has been very materially damaged as a hotel property.

Mr. SMITH. It has been closed for a year or two?

General MACKENZIE. Yes.

Mr. FITZGERALD. Where is Cushings Island?

Major ABBOT. Near White Head, Portland Harbor. White Head is that very bold cliff as you enter the harbor.

PROTECTION OF FORT CROCKETT, TEX.

Mr. SMITH. There are two other matters being pressed before the committee from the outside; one to provide for the protection against storms and flood of a part of the city of Galveston, Tex. Have you anything to say upon that project?

Mr. BRUNDIDGE. Would that not go to the River and Harbor Committee? It is for protection of a port and the shipping there.

Mr. SMITH. I was only going to develop the facts here. Is this enterprise at all connected with the protection of the seacoast fortifications of the United States?

General MACKENZIE. I am familiar with the conditions, but not with the bill itself.

Mr. SMITH. I refer to bill H. R. 4424, which is now before you.

General MACKENZIE. The Government has built a sea wall there, and it is low ground behind it. The people have given the Government quite a large strip of land behind this sea wall. Of course the sea wall will be safer with this filling behind it, and there is some connection between the sea wall and the proposed fill behind it and the securing of buildings on the Fort Crockett Reservation.

Mr. SMITH. Isn't it a fact that this is, like the other matter you were talking about, a protection to the land itself and not a protection to the fortification?

General MACKENZIE. The proposed filling is for the protection of the sea wall which the Government has built.

Mr. SMITH. The land is of no use to the fortifications proper?

General MACKENZIE. No; excepting indirectly.

ACQUIREMENT OF LAND AT CAPE HENRY, VIRGINIA.

Mr. SMITH. I now call your attention to the bill (H. R. 12311), being a bill introduced by Mr. Maynard to provide for acquirement, by condemnation, of lands at Cape Henry, Virginia, for the purpose of fortification and coast defense.

General MACKENZIE. I should hardly see the necessity for a bill——

Mr. SMITH. Has there been any action of the War Department establishing any coast-defense project at Cape Henry?

General MACKENZIE. All of these matters are to a limited extent confidential, but I should say that this Taft board will recommend

quite an elaborate and extensive defense at the mouth of the Chesapeake, but exactly what land will be needed in connection with that now I do not know.

Mr. SMITH. Can you say as to whether it is too early to determine what amount of money will be needed?

General MACKENZIE. I think it is a little early.

Mr. SMITH. You don't know now when that will be needed?

General MACKENZIE. No.

Mr. SMITH. I think that is all.

MILEAGE OF ORDNANCE OFFICERS.

General MACKENZIE. I want to submit one word in relation to the matter of mileage on page 21. There was an item, I think a modification, suggested by the Chief of Ordnance, and in consulting with him that was changed, as we have suggested, to cover our corps as well—to cover the fortification travel as well as his own. Last year at the hearings we had some little discussion in the matter. Formerly all expense connected with fortifications was paid out of the appropriation for it, including the mileage of officers traveling on fortification duties. The mileage bill contained a proviso that hereafter the mileage of officers shall be paid from the items herein, or some such wording as that. Immediately, of course, it was ruled that that included mileage to officers traveling on fortification duty as well as other officers.

Mr. FITZGERALD. Is it not better, General, to have all mileage paid out of one fund proper for mileage?

General MACKENZIE. It has been my thought that it would be better to have all the expenses of fortifications paid out of the item for fortifications.

Mr. SMITH. There is one difficulty, although I am not at all certain that this point is well taken, but the language of the Constitution is that no appropriation for the support of armies shall be made for a longer term than two years. It has been very doubtful, in my mind, as to the wisdom of putting anything in here for compensation to the Army for fear that it would destroy the whole section as an appropriation. I do not want to get anything into this bill which would throw any legal doubt upon the question as to whether the appropriation can be expended. A question of a similar kind came up last year, and I opposed an item in the bill, not because I was opposed to the principle, but because of the danger which I thought existed because of this provision in the Constitution.

General MACKENZIE. I had never thought of it in that light. I have had the thought that it was a part of the expense connected with fortifications and would rather come under that expense than the mileage.

Mr. SMITH. I fully agree with you, excepting as to the validity of the appropriation.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 27, 1906.

Mr. JAMES C. COURTS,
Clerk of the Committee on Appropriations,
U. S. House of Representatives, Washington, D. C.

SIR: I have the honor to return herewith, with corrections noted therein, the notes of the hearing before the subcommittee on fortifications of the Committee

on Appropriations, so far as it relates to the work of the Engineer Department. It is requested that three copies of the report of the hearing, when printed, be furnished to this office.

Replying to the questions of Mr. Smith, I have to state—

(1) The total cost to date of the fire-control installation at the eastern entrance to New York Harbor is $85,000. In addition to this there is an available balance of $15,000 in the hands of the local officer, which, it is estimated, will just about complete this installation. The armament which this installation is designed to serve is as follows:

At Fort Slocum: Sixteen 12-inch mortars and two 6-inch rifles.

At Fort Schuyler: Two 12-inch rifles and two 10-inch rifles.

At Fort Totten: Eight 12-inch mortars, two 12-inch rifles, two 10-inch rifles, and two 8-inch rifles.

(2) With regard to the balance available on June 30, 1905, from the appropriation for plans for fortifications the amount should have been taken from the extreme right-hand column on page 73, where it is stated to be $5,000, and not from the right-hand column on page 72, which shows the aggregate appropriations for 1905 and 1906, the warrant for the latter appropriation carried by the act of March 3, 1905, having been issued prior to the close of the fiscal year 1905. As shown in the third column on page 73, $5,000 of the amount stated in the right-hand column of the preceding page was expended during the fiscal year 1905. On December 31, 1905, the actual balance remaining from this appropriation was $3,793.46.

Very respectfully,

A. MACKENZIE,
Brigadier-General, Chief of Engineers, U. S. Army.

FRIDAY, *January 26, 1906.*

ORDNANCE DEPARTMENT.

STATEMENT OF BRIG. GEN. WILLIAM CROZIER, CHIEF OF ORDNANCE, U. S. ARMY, ACCOMPANIED BY CAPT. CHARLES B. WHEELER, AND CAPT. TRACY C. DICKSON, U. S. ARMY, ASSISTANTS TO THE CHIEF OF ORDNANCE.

PROVISION AS TO CONTRACTS.

Mr. SMITH. General Crozier, turning to page 6 of the bill, I would like to inquire at whose suggestion is the proposed modification of this language in the item below the middle of the page? Do you know?

General CROZIER. I think that is at the suggestion of the Chief of Engineers.

Mr. SMITH. Then we will pass it, because we heard him yesterday. As I understand it, the Department concedes that the modification except for the insertion of the words "and hereafter," was ill defined, and that the language will be restored as it was in the last bill, except as to those words.

General CROZIER. It does not apply to any of the work in my department. We have not suggested any change in recent years.

Mr. GRAFF. The idea is to make it continuing law?

Mr. SMITH. Yes. The other changes were not considered advisable, in my judgment, and I understand the Department has changed its mind about it.

Mr. GRAFF. What change is that?

Mr. SMITH. The changes of capitalization and the combination and separation of items as indicated by the brackets. The brackets are to strike out; the italics are to insert?

Mr. GRAFF. Yes.

ARMAMENT OF FORTIFICATIONS—PURCHASE, MANUFACTURE, AND TEST OF MACHINE AND AUTOMATIC GUNS.

Mr. SMITH. Turning to the seventh page of the bill, then, we find the item at the top, "Armament of fortifications," " For the purchase, manufacture," and, as the old language was, " test, and issue of machine and automatic guns, including their carriages, sights, implements, equipments, and the machinery necessary for their manufacture at the arsenals." I notice a change of language is proposed in this, which is in your branch, General.

General CROZIER. Yes; we propose to leave out the words " test and issue " and substitute the words " and test," so that the item will read: " For the purchase, manufacture, and test of machine and automatic guns."

Mr. SMITH. From what appropriation do you expect hereafter to pay for the issue of these guns?

General CROZIER. Chiefly from the appropriations of the Quartermaster's Department, which usually have been applicable for that purpose, but which would be prevented from being used by the insertion of this specific language in this bill. It would require that these appropriations which are awkwardly used for that purpose, which go much further than was anticipated when that language was put in there, should be used only for a specific purpose. It was found that the language would compel us to use this appropriation for a lot of expenditures that it was not expected to be used for, and therefore it would aid toward uniformity to make the change.

Mr. SMITH. What was the unexpended balance on the 31st of December of this appropriation?

General CROZIER. The Treasury balance on December 28, 1905, was $267,957.42, but that did not represent the balance which was available for my use. Part of this Treasury balance, the greater part of it, had already been allotted. The work was under way, but the payments had not fallen due, and were not going to fall due in the immediate future, so that the money had been left in the Treasury. The balance which I had unallotted at the same date, December 28, 1905, was $40,513.76.

Mr. SMITH. Now, you speak of " allotted " money. What portion of this work is done under contract and what part of it is done directly by the Government in the manufacture and test of these machine and automatic guns?

General CROZIER. I do not think that any of it is done by the Government.

Mr. SMITH. The language is " For the purchase and manufacture."

General CROZIER. I will correct that by saying that a few of the wheeled mounts, the wheeled carriages for these guns, are made by the Government; but the guns themselves, the tripod mounts and the other material, are practically all purchased from private manufacturers.

Mr. KEIFER. On advertisement?

General CROZIER. Yes, sir.

Mr. SMITH. Now, when you say that these funds have been allotted, have the contracts been let?

General CROZIER. Yes.

Mr. SMITH. So that the balance would be what?

General CROZIER. $40,513.76.

Mr. SMITH. What did you say the total balance was?

General CROZIER. In the Treasury, $267,957.42 on the 28th of December. That was the status at the end of December. This balance available for allotment has diminished some since then. It is diminishing all the time.

Mr. SMITH. Certainly. We are taking it up to the 1st of January, as the nearest standard point we could bring it to. Now, what is your estimate as to the further amount necessary to completely equip the military establishment with guns and other matters covered by this item?

General CROZIER. I shall need 708 more of these guns than have been heretofore provided for. In the 708 are included those covered by this estimate. The number which has heretofore been provided for is 227.

Mr. SMITH. Do I understand that the 708 includes the 227, or are 708 more needed?

General CROZIER. Seven hundred and eight more are needed, and of these 708, only 23 are provided for in this estimate, so that at that rate it will take a long time to procure all that are needed. Perhaps I should explain here, in connection with this item, that the greater number of these guns will not be needed for fortifications. They are provided in this bill both for fortifications, where they are used principally for repelling landing parties, and for a field arm for use with the armies in the field; and for such use we contemplate providing one of these guns for each battalion of infantry and one for each squadron of cavalry.

Mr. SMITH. For how large an army does this total estimate provide?

General CROZIER. This will provide for an army of 500,000 men.

Mr. SMITH. How much of an army could you supply now, fully up to your standard?

General CROZIER. We have not yet enough to supply the Regular Army as it stands to-day. Fifteen of the 23 which are asked for in this estimate will complete the number required for the Regular Army as it stands to-day.

Mr. SMITH. That is, an army of approximately 60,000 men?

General CROZIER. An army, approximately, of 100,000 men, because when the Army is increased from 60,000 to 100,000 men the number of battalions and squadrons will not be increased, but the battalions and squadrons will simply be made larger. We simply supply one gun for each battalion and squadron, whatever its strength will be. Therefore, this will be enough for an army of 100,000 men, which is the maximum allowable strength of the Army to-day.

Mr. SMITH. I understand you to say you will need three times as many more.

General CROZIER. A considerable number of those that we have at present are arranged for use with the fortifications and not with the Army in the field.

Mr. SMITH. So that that accounts for the apparent discrepancy?

General CROZIER. Yes.

Mr. SMITH. What number of this 708 are for the fortifications, and what number are for the Army?

General CROZIER. You mean of the 227?

Mr. SMITH. Yes; I say what number are for the Army and what are for the fortifications proper?

General CROZIER. Of that number, 120 are for the use of the Army in the field, and 107 are for the use of the fortifications.

Mr. SMITH. Does that allow the fortifications sufficient for the fortifications that are now existing?

General CROZIER. No; it does not. There will be needed for the fortifications in the United States 93 more.

Mr. KEIFER. Two hundred in all?

General CROZIER. Yes, exactly 200; that is right. So that, as the matter stands now, we will need for fortifications 93 more. We need to-day for the Regular Army 15 more. We need for a reserve for a war-time army 600 more.

Mr. SMITH. What is the nature of these guns, as to length of time required to purchase them after the contracts are let?

General CROZIER. Judging by our experience thus far, the outlook is a little discouraging. Something more than a year ago—I think about two years ago, perhaps—I had a competitive trial of guns of this class, and an English gun known as the Vickers-Maxim won out in the trial. It was found to be the best. That gun was not manufactured in this country, so that it was necessary to commence procuring them abroad; but that condition was not satisfactory, and through my encouragement arrangements were made by which an establishment should manufacture them in this country, and they entered into relations with the foreign manufacturers to get the plant and acquire the knowledge necessary to produce the guns in this country. They are now in a condition to make them in this country. I do not know exactly what the capacity of their plant is. They have not yet completed any guns in the United States.

Mr. SMITH. In how many years could you probably get perfectly furnished, if you had all the money you wanted, General? Have you any idea at all about that?

General CROZIER. Just at present I do not believe I could get more than 150 or 200 a year.

Mr. SMITH. What do they cost?

General CROZIER. About $2,500 apiece. That includes the mount. Those for the field army are mounted on tripods, and those for the fortifications are mounted on wheel mounts.

Now, the manufacturing capacity would be increased to meet the larger demands if the appropriation was increased; but these guns require a special plant for their manufacture, and as the guns are all made by private manufacturers the plants would not be brought into existence and would not have any existence and could not be maintained unless employed. They must either use their plant or convert it into something else.

Mr. SMITH. I presume the policy of the War Department, as it seems advisable to the committee, would usually be more liberal with those matters which take a long time to procure than with those that can be speedily procured in an emergency. I suppose that is the policy of the War Department?

General CROZIER. Yes; that is a wise policy.

Mr. KEIFER. I notice that the caliber of these automatic machine guns is .30. Is that the same as the Krag-Jörgensen?

General CROZIER. Exactly.

Mr. KEIFER. So that it uses the same ammunition?

General CROZIER. They will use the same ammunition as the musket with which we are now replacing the Krag-Jörgensen.

Mr. KEIFER. Is there any material change in the ammunition for the new gun which is to take the place of the Krag-Jörgensen?

General CROZIER. The new gun uses the same bullet as the Krag-Jörgensen, but the cartridge is different; the powder charge is different. The new gun has a higher velocity than the Krag-Jörgensen, and consequently a larger charge of powder.

Mr. KEIFER. The cartridge would not work in the chamber of the other gun?

General CROZIER. No.

Mr. KEIFER. But these new guns are now in harmony with the automatic machine gun?

General CROZIER. Yes; they will use the same ammunition.

Mr. KEIFER. Now, do I understand that it is the policy of the military authorities to assign one of these automatic machine guns to each battalion of infantry and in the same proportion to each squadron of cavalry for actual service, or is it a mere mode of determining the number?

General CROZIER. At the present time it is a mere mode of determining the number, sir; but the definite manner of their utilization, whether or not it will be by assignment of one gun to each battalion or squadron of cavalry, is under consideration now. I have asked that question and it has been submitted to the General Staff, but the answer has not yet been forthcoming.

Mr. KEIFER. In the Russo-Japanese war they talked about that at the beginning, but abandoned it, as I understand it, and made reserves of them and put them it the proper proportion to the army, just as we used reserve artillery in the civil war. We used to have a single battery assigned to the infantry of every brigade; but that did not last but a little while, you know, and they were afterwards massed and used separately.

General CROZIER. Are you not thinking now, General, of the field artillery of larger caliber, and not of the automatic machine guns?

Mr. KEIFER. Yes; I know the field artillery was formerly assigned to each brigade, but they broke up that arrangement. Will they not do the same thing with this?

General CROZIER. They will break up that organization for field artillery and use it in masses. But these guns, you know, give infantry fire. They use the same cartridges as the small arms.

Mr. KEIFER. That was the matter I was curious to know about.

General CROZIER. That is a practical matter which——

Mr. KEIFFER. I mean that they were massed in particular spots where needed, instead of being put in the middle of a battalion. You could never get along with them with the cavalry that way. It might do with the infantry.

General CROZIER. Just as a matter of speculation, I think it might be said that if it were a question of holding a particular portion of a line where it was not intended to make a defense, but which it was desirable to hold while a lot of troops were used somewhere else for an offensive movement, that portion of the line would likely be provided with a considerable number of these machine automatic guns, because they would furnish a large volume of fire, which is like infantry fire,

over the area in front of them, and therefore they would assist materially in holding the line.

Mr. KEIFER. Not only that, but if a large body of infantry was coming forward in a charge, if they could be massed to meet that, instead of being scattered along for miles, it would be more efficient. But I do not believe there is anything wrong in the mode of ascertaining the number of these guns on the plan you have got.

Mr. SMITH. It is simply a plan of balancing the equipment of the service, as I understand it. Is not that all?

General CROZIER. Yes.

Mr. SMITH. Now, before passing to the next item, for the moment, General, as I understand it the Ordnance has the supply of these munitions and the artillery has the operation of them, in a general way?

General CROZIER. Yes.

Mr. SMITH. Is that true of the submarine defense, which has been transferred to the artillery from the Chief of Engineers?

General CROZIER. Not in the same degree. The artillery supply as well as use the materials of the submarine defense. I audit their accounts, that is all.

Mr. SMITH. In order that we may proceed intelligently with the further examination, is there anything else covered by the estimates of the Chief of Engineers that is supplied by the Artillery except the material for submarine defense?

General CROZIER. Nothing else.

Mr. SMITH. All else is supplied by your branch?

General CROZIER. Yes, sir.

PURCHASE, MANUFACTURE, AND TEST OF MOUNTAIN, FIELD, AND SIEGE CANNON.

Mr. SMITH. Then, passing to the next item, "For the purchase, manufacture, and test of mountain, field, and siege cannon, including their carriages, sights, implements, equipments, and the machinery necessary for their manufacture at the arsenals." How recently did you adopt the new type of field gun?

General CROZIER. Something over two years ago. The new field gun has been in the hands of the troops, however, only since this last spring, and it is only about the present time that the entire Regular Army has been supplied with them. That is the only change that we have made in the field gun in twenty years.

Mr. SMITH. That is the only change in the field gun in twenty years?

General CROZIER. Yes, sir.

Mr. KEIFER. What is the caliber?

General CROZIER. Three-inch caliber.

Mr. SMITH. What was the nature of this change, as to whether or not it totally destroyed the value of the old field gun. In other words, could the old field gun be remodeled into a new field gun or was it practically worthless after adopting the new one?

General CROZIER. The change was greatest, not in the gun, but in the carriage. The new gun is not very much more powerful than the old gun. It is of a little smaller caliber, nevertheless firing a little heavier projectile; but it does not differ much in power. The principal difference in the carriage is that for the new gun it permits

a very long recoil of the gun upon the carriage on discharge, a recoil of something near 3 feet, or nearly 4 feet—over 3½ feet. For this reason the action of the gun upon the carriage in recoil is so gentle that the carriage is not disturbed from its place, and time is not lost in reaiming the gun and moving the carriage back to its position, and therefore the rate of firing is very much increased; so that instead of being able to fire but one round per minute, or at times two rounds per minute, which would be the limit with the former gun, we can now fire with the present gun easily 15 rounds per minute. That is the principal difference.

Mr. SMITH. Can the old gun be remodeled into the new gun, or approximately so?

General CROZIER. The old gun or carriage can be substantially remodeled into the new, and I hope that I shall be able to get at it to convert a considerable number of the old guns into something like the new model. In the meantime the old gun will constitute a reserve, the only reserve that we have, and I expect to use a part of the money that I am going to ask you for in later items in putting the old guns in good condition for the reserve.

Mr. SMITH. Are these later items new or old items?

General CROZIER. The one I am alluding to now particularly is a new item of appropriation. I estimated for it last year, but the matter was not far enough along for the committee to put it in the bill, and there was no appropriation.

Mr. SMITH. In this connection, if we give you the appropriation under the new item and give you your estimate under this item we will be largely increasing the appropriation for the same subject, in effect; that is, for the equipment of the Army with mountain, field, and siege cannon?

General CROZIER. Let me explain to you what this appropriation will do, if you decide to make it. I am hoping to supply for use in war 250 batteries of guns of this class; perhaps not all of this identical caliber, but of this general class. That will be at the rate of two guns per thousand men for any army of 500,000, which is a very moderate estimate; an estimate below that of most people who have given attention to the subject. But I made it moderate in order not to be startling. Thus far there has been provided by appropriations which have been in the original charge of this committee and by those which have been in charge of the military committee enough money for 69 of these batteries.

Mr. KEIFER. How many guns in a battery?

General CROZIER. Four guns at present, of which 35 batteries have been for the Regular Army and the reserve, and 34 have been for the use of the militia. That will leave such a number to be provided that at the rate at which they are estimated for in this item a supply will be completed in the year 1919.

Mr. SMITH. Now, speaking of that, as I understand, the Committee on Military Affairs provides you with the type of gun for the militia?

General CROZIER. Yes, sir.

Mr. SMITH. And we are supposed to provide it for the regular establishment?

General CROZIER. Yes; and for the reserve. Of course it should be said that the batteries in the hands of the militia will constitute part of the reserve, as the militia itself constitutes a reserve arm, and when

called into the service of the United States through the action of the President, which it is competent for him to do now under the law in an emergency, of which he is the only judge, they will bring the guns with them.

Mr. SMITH. Practically that has always been so?

General CROZIER. That has always been so, so that among the 250 which are needed I count both those in the hands of the Regular Army and those in the hands of the militia, as well as those in storage, as reserve.

Mr. SMITH. I presume you did not quite catch the thought in my other question. We have given you $600,000 for this item last year. What is the balance unexpended and available under this item?

General CROZIER. The Treasury balance at the end of December was $1,004,029.65.

Mr. SMITH. What was the uncontracted balance?

General CROZIER. $118,702.01.

Mr. SMITH. Now, you say the entire Regular Army is actually supplied with this gun?

General CROZIER. Yes; I think they have all got them now.

Mr. SMITH. So that practically you already have a million dollars' worth of these guns appropriated for this reserve?

General CROZIER. There are 26 regular batteries that have these guns—no; I should say 24.

Mr. SMITH. You tell us you have over a million dollars unexpended. Of course those guns can not be in the hands of the Army, all of them. This whole million dollars' worth must be for the reserve?

General CROZIER. That is not exactly true, and I will explain to you why it is not in a moment. There are 24 regular batteries using these guns. Congress has appropriated enough funds to provide 35 of these batteries for the regular service and the reserve. Therefore there are 11 batteries which are provided for for the reserve. They cost about $55,000 per battery, or something of that sort, so that the total amount which is involved in these reserve batteries is something like $700,000.

Mr. SMITH. That may be true, General, in a bookkeeping sense, but I do not yet understand why, if the Regular Army is now supplied and you have $1,000,000 unexpended, that does not all go to the reserve batteries.

General CROZIER. You see, this item covers "mountain, field, and siege cannon, including their carriages, sights, implements, equipments, and machinery necessary for their manufacture at the arsenals." In other words, it covers other items besides these 3-inch field guns. The discrepancy is not great. It is easily accounted for by that fact.

Mr. SMITH. You mean the distinction between the mountain and siege guns and these batteries?

General CROZIER. Yes. I will give you an illustration. I have been trying for some time to produce a siege gun of a new model of the class corresponding to this field gun. Our siege gun is fast becoming obsolete. We wish to introduce a new model—more efficient. I have not been able on account of my limited force of officers—which I have asked Congress to increase for me—I have not yet been able to succeed in getting the new siege piece in the hands of the people or the Army or even under manufacture for the use of the Army.

With my best effort I have just succeeded in getting out an experimental siege gun and getting it down to Sandy Hook for trial. It is just about going there now. Of this sum I expect to use $65,000 in procuring a battery of four of these siege guns, provided this experimental one turns out successfully.

Mr. SMITH. So that you have expended no money except in experiments in siege guns at all up to date?

General CROZIER. Not of these appropriations; not recently. We are not building any of that class of guns for the service now, and have not been for a number of years.

Mr. SMITH. Now, returning to my question, General, if you incorporate a new item for the remodeling of the old guns and converting them as nearly as practicable into modern guns, and we give you the $600,000 we gave you last year, then we practically increase the appropriation for equipping the Army with this form of defense by whatever sum we give you for remodeling purposes?

General CROZIER. I have not estimated anything for remodeling purposes. All I have asked for is a small amount for painting and repairing, but not for remodeling. When I come to remodeling I shall then state what I am asking for for that purpose. I have not gotten to that yet.

Mr. SMITH. I thought you said that upon another item of the bill you hoped to enter upon this rebuilding of the old guns into modern guns?

General CROZIER. No; I simply want to put these old field guns into effective condition by painting and overhauling and repairing, but not by changing them.

Mr. SMITH. How near have you an equipment for an army of 500,000 men as you now stand?

General CROZIER. We have at present 362 of the old guns. That is about 90 batteries, and I have 69 batteries of the new guns provided. Ninety and 69 are 159, and I need 250, so that there would be still needed 91 batteries.

Mr. KEIFER. You need them for 500,000 men?

General CROZIER. Yes; for an army of 500,000 men.

Mr. KEIFER. I thought you wanted a thousand.

General CROZIER. A thousand guns—250 batteries. I am speaking now of batteries.

Mr. FITZGERALD. Upon that basis you would have enough for an army of 300,000 men?

General CROZIER. Yes; it would come out about so.

Mr. FITZGERALD. It would be 350,000 men.

General CROZIER. The proportion would be as 159 is to 250; so is the army I have provided for to 500,000 men. It would be two guns to a thousand men. It would be an army of about 318,000 men. I would like to say in connection with this item that it is a very important one, because this material is of a class that can not be procured on short notice. It takes a great while to build these guns, and to build the carriages, and to get the ammunition for them.

Mr. SMITH. I wish you would call our attention to that fact in all items that take time to procure, as we go along, without special request to do so.

Mr. FITZGERALD. I understand you to say there is very little change in the efficacy of the gun in twenty years?

General CROZIER. Of the gun itself; yes. It shoots just about as hard now as it did twenty years ago.

Mr. SMITH. But a great deal faster?

General CROZIER. Yes; a great deal faster.

Mr. FITZGERALD. What difference has there been in the cost?

General CROZIER. There has been a great difference in cost, because the new gun carriage is considerably more of a machine than the old. It has more elements that constitute mechanism than the old carriage had, and it requires in consequence both a larger expenditure for its construction and greater care for its maintenance and use.

Mr. FITZGERALD. What is the cost of the modern gun, and also of the old?

General CROZIER. A new battery complete costs about $61,000, including guns, carriages, caissons, limbers, battery wagons, and a store wagon, but not including harness.

Mr. FITZGERALD. Two guns or four guns?

General CROZIER. Four guns.

Now, an old battery of four guns would not cost more than $25,000, including all those items.

Mr. KEIFER. You mean per battery or per gun?

General CROZIER. I mean per battery.

One reason why the new battery is more expensive, in addition to the reason of greater complexity, which I have just given, is that we provide more caissons per gun for the new battery than we did for the old. With the old we provided one and one-half caissons per gun. Now we have doubled the supply of caissons because the gun fires more rapidly.

Mr. BRUNDIDGE. In view of the fact that this improvement has been made and that others will likely be made and changes take place, do you think it necessary that the Government should now go ahead and stock up with these guns for an army of 500,000 men, and leave no room whatever for better supply in the event of improvement?

General CROZIER. I do not see any escape, Mr. Brundidge, from the necessity of providing these guns. When you use the term "stocking up now," you will note that in my estimate I spread the period described as "now" from the present time to the year 1919. That is a long "now."

Mr. BRUNDIDGE. I understand; but in making that you expressly provide for this particular class of gun. There is no allowance made for any improvements or changes that may be made.

General CROZIER. If changes are made between now and the year 1919, we will cease getting this gun and pass on to the new one.

Mr. KEIFER. I wanted to ask a question or two. What is this mountain gun, as distinguished from the field gun?

General CROZIER. The mountain gun is considerably smaller than the field gun, although it is of the same caliber.

Mr. KEIFER. The caliber is the same?

General CROZIER. The caliber is 3 inches, but the mountain gun fires its projectile with much less effect—900 instead of 1,700 feet per second. It has a smaller carriage and is carried on the back of pack mules.

Mr. KEIFER. Does it use the same ammunition as the field gun?

General CROZIER. It uses the same projectile, but the charge of

powder is much less. It would not endure the charge of powder of the field gun.

Mr. KEIFER. What is the caliber of the new siege gun?

General CROZIER. 4.7-inch, and it will fire a projectile of 60 pounds. I expect to get one battery of these siege guns out of a balance which I have left from appropriations which have been made heretofore under this item; but out of the estimate that I am making now to you I do not expect to get any siege guns.

Mr. KEIFER. The item provides for it, so that you could if you wished?

General CROZIER. Yes.

Mr. SMITH. The estimate provides for $600,000 to procure seven 4-inch batteries of 3-inch field material, complete, for reserve supply; forty-eight 3-inch field limbers for reserve to complete militia batteries, etc.

Mr. KEIFER. It provides for that?

General CROZIER. Yes. This item covers all that class of artillery which we call mobile artillery, as distinguished from the fixed artillery of the coast defense, and automatic machine guns which give concentrated infantry fire.

Mr. KEIFER. You speak about using old field guns and keeping them in order so that they can be utilized, some of them; but do you use the same ammunition?

General CROZIER. No, sir.

Mr. KEIFER. Is not that a serious objection, having two classes of field guns, perhaps on the same battlefield, with different ammunition?

General CROZIER. That is undoubtedly an objection.

Mr. KEIFER. Is it not a serious objection?

General CROZIER. Yes; it is a serious objection; but it is not as great an objection as it would be to build our new field guns of a less advantageous caliber in order to make the ammunition the same as that of the old type. The conclusion is that the advantage is greater from the change of caliber than the disadvantage that would result from the difference in ammunition.

Mr. KEIFER. You spoke of the recoil of the new gun. Do I understand that the new gun is so constructed that it does not require such recoil as the old field gun?

General CROZIER. The new field gun recoils nearly 4 feet on the carriage itself, without the carriage itself moving on the ground. The old gun had no recoil on the carriage.

Mr. KEIFER. I do not know about the new gun at all. Then, the effect of the new gun is that you get some recoil without moving the wheels?

General CROZIER. You get all of the recoil without moving the wheels. The gun moves nearly 4 feet; it slides back about 4 feet on the carriage, and by a spring it is pushed back into its position again.

Mr. KEIFER. Is that machinery perfect, so that it will stand it? Will it stand that kind of work for a few hours?

General CROZIER. We have put it through very severe trials, not only on the proving ground, but it has also been used all last summer in the hands of the troops. We formed two provisional batteries of artillery, one at Fort Riley and one at Fort Sill, and they have

been practicing with this gun all summer and giving it thorough tests.

Mr. KEIFER. That would be my doubt, of the machinery having that recoil on the carriage. That is of the greatest importance.

General CROZIER. Yes; that is a matter of very painstaking and anxious calculation to get it so that it will stand this strain. That is not easily done, but we think we have got it now.

Mr. KEIFER. Is it not quite as important in the matter of firing on soft ground, whereas when you had the old gun and got in the mud when you fired it you knocked the axles off?

General CROZIER. The strain is much lighter on this gun.

Mr. KEIFER. You could stand the carriage in the mud under the new arrangement? You could not do it with the old. The axle would come off.

General CROZIER. Yes.

Mr. GRAFF. Is this recoil device one that was patented or devised by outside people, or was it done in the War Department?

General CROZIER. The French are entitled to the credit of its original production; they first devised and put into the service of their artillery a type of gun having this long recoil. The rest of the world has followed in their footsteps. In following their lead we have encountered very few patented devices which we wished to employ. I do not think any of them apply to the carriage itself. I think that at present we have designed a gun and a gun carriage such that we are not paying royalties upon the carriage itself.

Mr. GRAFF. I was curious to know, and I thought it might be of some value to the committee, what policy the Department or Bureau first pursued where these ordnance devices were made, as they are in this item, by the Government itself, with regard to the plans and specifications used with reference to the improvement and manufacture of these guns. Do you purchase patents?

General CROZIER. When we find it desirable to use a patented device we pay royalty for it; we do not seek to avoid it.

Mr. GRAFF. What body of officers has charge of the consideration and determination of the model upon which a gun shall be made?

General CROZIER. My department does that, sir; I will add that these guns are made both in Government establishments and by private manufacturers. But thus far they have been made upon designs furnished by the Government.

Mr. SMITH. There is just one matter that I want to call your special attention to, General. I notice in the report of General Russell, Acting Chief of Ordnance, there are included forty-eight 3-inch field caissons for reserve to complete militia batteries. What have we to do with that item, as you understand it?

General CROZIER. As I explained a moment ago, three caissons are provided per gun.

Mr. SMITH. I do not think you caught my meaning.

General CROZIER. Yes; I understand your question, sir, and I will explain in a moment. That would make twelve caissons per battery. These caissons are largely to carry simply a reserve supply of ammunition, and there seems no particular reason for issuing the entire twelve caissons to the militia with each battery. They would simply keep them in their sheds. They would not use them for their drill

purposes, and they would not need them in training the militia into an effective organization. Therefore we issue to each militia battery only six caissons instead of twelve. Now, the remaining six caissons should be on hand for use in case of war, and therefore we contemplate providing them and keeping them in storage.

Mr. SMITH. That does not get at the question I had in mind at all. What I wanted to know is, how we are to provide for the militia reserve equipment?

General CROZIER. This reserve will only be used in case of war. When the militia is called into the service it will bring into the service only half of the number of caissons that it ought to have. There must be some way of providing them with the other half, and this is the way that I have taken.

Mr. SMITH. If it is to come within the jurisdiction of this committee, ought it to be called a militia reserve—because it is never to be issued to the militia? It is to be militia only before they come into the service of the United States, and does not that tend to show that it is not within the jurisdiction of the committee, whereas it is never to be issued to them while they are militia?

General CROZIER. It is only explanatory in the note. That note does not go into the law, you know. It is only in the note that I say what these limbers are for. The law does not contain that itself. That language could be changed, and it could be said that it is to provide limbers to correspond with the total number of guns that are provided from all sources for use in case of war.

Mr. SMITH. Of course, upon its face the estimate would seem to show, without explanation, that you never intended to issue them to the militia. That is what I am getting at.

General CROZIER. We do not intend to issue them to the militia in time of peace.

Mr. SMITH. And never to the militia as militia in time of war, because in time of war they would be mustered into the service of the United States. I call that to your attention because if this should be examined by the Committee on Military Affairs they might think this committee was invading their province by providing for this militia, whereas this is intended really for the service of the United States.

General CROZIER. It is stated that they are to be issued to the militia, to remain as the property of the United States, in the other appropriation; but in this there is no such wording.

Mr. SMITH. The only question would be whether, upon the floor of the House, for example, the Committee on Military Affairs would complain upon the face of this note that we were invading their province. I simply brought it up to clear it in our own minds. I did it to ascertain the situation, so that we could defend ourselves.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION FOR MACHINE AND AUTOMATIC GUNS, AND FOR MOUNTAIN, FIELD, AND SIEGE CANNON.

The next item is "For the purchase, manufacture, and test of ammunition for machine and automatic guns, and for mountain, field, and siege cannon, including the necessary experiments in connection therewith, and the machinery necessary for its manufacture at the arsenals."

General CROZIER. You see there that I have consolidated the estimates for ammunition for guns which are themselves to be purchased out of the two preceding items of the appropriation. The amount of ammunition that I have asked for will be sufficient to practically fill the ammunition chests of all the batteries which have been provided for up to and including the bill making appropriations for the current fiscal year, and in addition it will provide for a percentage of a new class of shells that we have commenced to use for our mountain batteries. It will provide 10 per cent of the latter. I have enough ammunition for these mountain batteries of all classes except a new high-explosive field shell. I expect to get 10 per cent of the number required for all mountain batteries out of this appropriation. I also expect to get enough ammunition to provide between thirty-two hundred and thirty-five hundred rounds for each one of the automatic machine guns mentioned in the first item.

Mr. SMITH. Now, what percentage of this appropriation is intended for reserve ammunition. Have you any idea?

General CROZIER. All of it. We have another item for ammunition for target practice.

Mr. SMITH. I notice it is only with reference to automatic guns that you speak of it as reserve, and the item itself does not specifically state that it is for reserve.

General CROZIER. Of course, some of it is used for experimental purposes in testing and proving new guns as they are built. I have divided the appropriations for ammunition supply into two classes, that which is used for target practice and that which is used for other purposes, and among the other purposes the principal item is for the reserve, but not the only one.

Mr. SMITH. So that substantially this is a reserve item?

General CROZIER. Yes.

Mr. SMITH. What is the unexpended Treasury balance of this item?

General CROZIER. $263,790.83. That is the Treasury balance. Now, the unallotted and unmortgaged balance is $70,584.56. Both are of the same date, December 28, 1905. Of couse that unallotted balance has become smaller.

Mr. SMITH. Now, is there a proportion between the $70,000 and the $260,000 that you simply made an allotment of, as to the kind of ammunition, or do you mean you have contracted all above the $70,000?

General CROZIER. I either contracted for it or else gave orders for its manufacture in a Government establishment.

Mr. SMITH. When you simply set aside an amount for one kind of ammunition, you do not call that an allotment?

General CROZIER. Not until I give the order, either to private individuals or to the Government establishments.

Mr. SMITH. So that this $70,000 is all that is really available?

General CROZIER. Yes, sir.

Mr. SMITH. Now, what amount of the previous appropriations here are now in reserve, do you know, under this item? You say the item covers partly reserve and partly other purposes. How much, can you tell me, of the previous appropriation for this item is now in reserve ammunition?

General CROZIER. I can tell you how much reserve ammunition I have, but I do not believe that I have converted it into its money

value. I can tell you how much reserve I have of every kind—projectiles, powder, cartridge cases, and things of that kind. It is quite a large table. You see it here. [Indicating tabulation.]

Mr. FITZGERALD. Do you publish that?

General CROZIER. We do not.

Mr. SMITH. I do not think we want that in the record, anyway, because we are familiar, most of us, with it, and would not want it in the record anyway. However, you might tell, for instance, how many years' appropriations you have in the reserve now. Is much of this reserve worthless now?

General CROZIER. These reserves that I have here? No; none of it is worthless.

Mr. SMITH. You have been receiving appropriations for this ever since the Spanish war in more or less measure. Your reserve in 1899 was a million and odd dollars, and since then you had $115,140 for 1901, $300,000 for 1902, and $211,600 for 1905, and $200,000 for 1906. Now, which of these sums was invested in reserve ammunition before the change in the field gun? Much of this was invested in reserve ammunition before the change of field guns, was it not?

General CROZIER. Yes.

Mr. SMITH. It is now comparatively worthless?

General CROZIER. No; it is good ammunition. If we were to have a war at any time within the next ten years we would have to use that gun.

Mr. SMITH. Do you desire to have any more ammunition for that gun than you have now—for that old gun?

General CROZIER. I have not estimated for any more ammunition for that gun. The present reserve supply is sufficient.

Mr. SMITH. What other matters covered by these three items are obsolete, besides the old field gun?

General CROZIER. The siege gun, the siege howitzer, and the siege mortar.

Mr. SMITH. You are not asking anything for them?

General CROZIER. We are not intending to spend any appropriation for that.

Mr. KEIFER. When you say "howitzer" you mean mountain gun?

General CROZIER. No, sir; The siege howitzer is of 7-inch caliber and fires a 109-pound projectile, and makes a load for an eight-horse team.

Mr. KEIFER. Will this infantry ammunition and field-gun ammunition deteriorate?

General CROZIER. It is a little difficult to say positively that we have gotten the smokeless powder to such a stage of perfection that it will not deteriorate, but we think so; and none of the other elements of ammunition are subject to deterioration.

Mr. KEIFER. I suppose not. But it is a pretty important matter, if it does deteriorate, that we should know, if possible.

General CROZIER. We do not know as much about the smokeless powder, which everybody uses now, as we knew about the charcoal powder, which it replaced.

Mr. KEIFER. That always deteriorated more or less, did it not?

General CROZIER. That always was apt to absorb moisture, but if you could keep it dry it would keep indefinitely.

Mr. FITZGERALD. Do not some people believe that smokeless powder after being kept for some time is apt to have a greater explosive force than at first?

General CROZIER. Yes; the reason for that is this: The smokeless powder which we now use for artillery in the United States Army is a solution of gun cotton in a mixture of ether and alcohol. By the process of solution it is converted into a paste, and while in this pasty form it is divided up into grains, and then it is dried in a warm compartment for something like six months, during which this solvent is gradually evaporated off. It does not all evaporate off, and after storage for a number of years an additional part of it may evaporate, leaving the powder somewhat drier, and consequently somewhat stronger.

Mr. FITZGERALD. Is that noticeable in the use of it?

General CROZIER. Yes; it has been quite noticeable in the use of it. We have adopted a method of storing this powder in hermetically sealed cases, whereby we hope that the solvent will not be able to get away, and we can retain it in practically the condition in which it was stored.

Mr. FITZGERALD. The same condition comes in the use of ordinary ammunition in a shotgun in a few years. It is very astonishing to see how it increases in force. [Laughter.]

General CROZIER. Sometimes disastrously?

Mr. FITZGERALD. Yes. [Laughter.]

Mr. SMITH. How much do you need to give you as much a reserve of the type of this ammunition as you desire ultimately?

General CROZIER. As I have just suggested, sir, the estimate which I have made will give what we consider the proper reserve for the batteries which have thus far been provided for, namely, about 69. All the reserve for all the batteries of the 250 which are wanted, which are yet to be provided, will have to be gotten subsequently.

Mr. SMITH. So, that, if I understand you rightly, the making of the appropriation you ask for this year would supply you with what you deem to be an adequate reserve for only the batteries now in existence and for those now provided for?

General CROZIER. Only for those now provided for by appropriations, including those in existence.

Mr. SMITH. As a matter of fact, those provided for will not themselves be available for a long time?

General CROZIER. We hope those already provided for will be available before another year.

Mr. SMITH. Is that so?

General CROZIER. Yes.

Mr. SMITH. I did not suppose the appropriation for these field guns, made last year, would be expended and the guns in possession of the Government in time to need the ammunition next year. But you think it would? You say the appropriation made last year for field guns would have the field guns equipped for the reserve?

General CROZIER. Yes, sir.

Mr. SMITH. I was speaking with reference to the length of time necessary to get the guns after the appropriation was made. It was two years?

General CROZIER. Yes, sir. We ought to be able to do it in a little less time than that, now that we have the manufacturers going.

PURCHASE, MANUFACTURE, AND TEST OF SEACOAST CANNON.

Mr. SMITH. Now, we will go to the next item, "For the purchase, manufacture, and test of seacoast cannon for coast defense, including their carriages, sights, implements, equipments, and the machinery necessary for their manufacture at the arsenals, $242,000." This is movable artillery, is it not, that this is intended to cover?

General CROZIER. No; this is intended to cover fixed artillery for the coast defense.

Mr. SMITH. You have a movable artillery for the seacoast defense, have you not?

General CROZIER. Some of these machine and automatic guns are intended for coast defense.

Mr. SMITH. Have you not movable artillery for coast defense outside of the rapid-fire gun?

General CROZIER. Yes; we have a gun firing a projectile of 7½ pounds for coast defense, for use against landing parties, but that is not covered by this item.

Captain DICKSON. That is a combination appropriation?

General CROZIER. Oh, yes; I beg your pardon. Some of these mobile guns I hope to get out of this appropriation—some of these guns of 2.38 inches caliber, firing a projectile weighing 7½ pounds, for the seacoast defense. These, however, are the only mobile guns that I expect to provide out of this appropriation.

Mr. SMITH. Now, I notice that while this is an item apparently for the acquisition exclusively of this kind of cannon, it is stated in the note that it is "estimated to procure improvement in breech mechanisms of seacoast guns, relining seacoast guns, necessary machinery and tools for use in manufacture and completion of seventy-four 15-pounder rapid-fire guns and mounts."

General CROZIER. Yes.

Mr. SMITH. And "relining seacoast guns." Is that a proper expenditure under the language of this item, that this is "for the purchase, manufacture, and test of seacoast cannon for coast defense," when it is intended almost entirely for the remodeling of existing guns?

Mr. KEIFER. That relates to the preceding item, does it not?

Mr. SMITH. No; the item at the bottom of page 8. The note says this item is sought for the purpose of procuring "improvement in breech mechanisms of seacoast guns; relining seacoast guns."

General CROZIER. Yes; both those items are included.

Mr. SMITH. Do you say "the purchase, manufacture, and test" of guns includes remodeling?

General CROZIER. For the improvement in breech mechanisms I am expecting to use some $20,000 of this appropriation, and I think that can probably be called part of an appropriation for the manufacture, because it supplies the guns with something which it would have been advantageous to give them at the beginning. This improvement in the breech mechanisms is something which increases the safety of the gun.

Mr. SMITH. I thought we had something in the last bill for modernizing seacoast guns, had we not? At least, we had the subject up here.

General CROZIER. Yes; it referred particularly to the carriages. I have an item later on for the alteration and maintenance of seacoast artillery.

Mr. SMITH. Is not that the proper item in which to put estimates for the improvement of breech mechanisms and so on, and not this item?

General CROZIER. You will notice that the item for relining seacoast guns in this note calls for only $15,000. That is an experimental expenditure. We have not thus far relined any particular seacoast guns. They are subject to wear. The wear of them, with the larger charges and the higher velocities which we utilize at the present time, has become a matter of very serious moment. Now, in order to determine that we can successfully reline them, we are intending to reline one or two and see how it turns out. When we have an appropriation for the supply of guns, such as this appropriation, we consider that it includes all experimental work that is connected properly with that subject, and a very important question is as to whether we can reline guns which have become too much worn for further use and at slight expense make them serviceable, or must manufacture new guns.

Mr. SMITH. Is not that an experiment for modernizing rather than for the purchase, manufacture, or test?

General CROZIER. If this experiment should turn out successful, and I should want money for the purpose later, I should say I would not ask for the money under this appropriation, but I would ask for it separately.

Mr. SMITH. Would this be under the purchase or manufacture or test or what? I would not think it was any of them.

General CROZIER. Perhaps it would be under alteration and maintenance.

Mr. SMITH. That would be my impression. I do not see how it could be the purchase or manufacture or test.

General CROZIER. I might say that your presentation seems very strong. I am perfectly willing to have $15,000 go off this item to add it to the other item for alteration and maintenance.

Mr. KEIFER. This is for the manufacture of guns.

General CROZIER. It is a manufacturing process.

Mr. KEIFER. It does not change the gun, but restores it?

General CROZIER. Yes; it restores it to its original condition. In making up this estimate I suppose I estimated I would need $15,000 for this purpose.

Mr. SMITH. What do you estimate you would require for improvement in breech mechanisms?

General CROZIER. It might be that it had better come under the item of alteration and maintenance.

Mr. SMITH. How much do you estimate for that purpose?

General CROZIER. Twenty-two thousand dollars.

Mr. SMITH. Have you there a reference to the alteration section? What page is it?

Captain DICKSON. It is on the bottom of page 12.

General CROZIER. It is the last item on page 12.

Mr. SMITH. Personally I am inclined to think those items should be deducted from the one item and added to the other. I do not want

to seem impertinent about your methods of bookkeeping, but it seems to me it should be under improvement or repairs—the relining of a gun—rather than under the purchase of a gun.

General CROZIER. I can improve the language of it; but with reference to the improvement in breech mechanisms I think that is something which should have been done to the guns while they were originally being made, and therefore you might say the guns are not properly completed until the guns are so changed.

Mr. SMITH. You put in the breech mechanism that was in style at that time?

General CROZIER. Yes, sir.

Mr. SMITH. Now, an improvement is made in breech mechanism which you want to put in in order to modernize the gun?

General CROZIER. Yes, sir. I will have no difficulty in utilizing the money if you will shift it over to the other item.

Mr. SMITH. I do not want to shift it, but don't you think yourself that this item should come under the head of alterations and maintenance instead of purchase?

General CROZIER. Some of these guns, Mr. Chairman, have never left the factory. They have not been in the service at all. We have caught them before they have gotten out, and we want to put this addition to the breech mechanism. It is not easy always to make a clear line of demarcation between the two classes of items.

Mr. SMITH. I see that; but the relining is all on the guns which have been in the service?

General CROZIER. Yes.

Mr. SMITH. But the breech mechanism may apply to either?

General CROZIER. Yes; and is actually being applied to both classes of guns.

Mr. SMITH. What is the Treasury balance on this item?

General CROZIER. $465,841.03.

Mr. SMITH. What is the available balance?

General CROZIER. Very nearly as much—$402,576.60 at the end of December. That is rather a large unallotted balance. Perhaps I ought to tell you that since that time in this particular case I have allotted $265,000 of the $402,000, so that at the present date that amount is considerable less.

Mr. KEIFER. Why have you not allotted more or used more?

General CROZIER. You see I have six months yet in which to give orders under my existing balance. The year is only half over.

Mr. KEIFER. When do you call the year over?

General CROZIER. On the 1st of next July. Of course this is not an annual appropriation. It is available until it is expended.

Mr. SMITH. You have forever in which to allot it?

General CROZIER. Yes. We hope to have it all practically mortgaged, at least before we meet you here again.

Mr. SMITH. These appropriations are available as soon as the bill is approved by the President?

General CROZIER. Yes.

Mr. SMITH. And you do not have to wait until the beginning of the fiscal year?

General CROZIER. No.

CARRIAGE FOR 16-INCH GUN.

Mr. SMITH. Now, I notice this item also includes the funds for the completion of that carriage for that valuable 16-inch gun.

General CROZIER. I hope to use $45,000 of this appropriation for that. It will not, perhaps, be enough to build the carriage, but with the balance left over it will be enough.

Mr. SMITH. How much have we given you heretofore for that carriage?

General CROZIER. Nothing, specifically.

Mr. SMITH. What do you estimate for that?

General CROZIER. I estimate for that $95,000. You have not given me the amount of my estimates heretofore, and I have had to cut them off here and there, and build my coat according to the cloth that I have had, and I have not been able to spend anything for this carriage except to get out designs. Nothing has been allotted to it, and nothing utilized except in making drawings and designs for it.

Mr. SMITH. We are simply mounting this gun because we have got it?

General CROZIER. That is all.

Mr. SMITH. You concede it never ought to have been made?

General CROZIER. I do not think we will reproduce it. It is a good gun; it is a first-rate gun. If we need as powerful a gun as this for the purpose of doing up the enemy we can build more of them, but we think we can get the better of him with a smaller and less expensive gun. I should not recommend the building of this gun if we did not already have it.

Mr. SMITH. What is the cost of the carriage of this gun as compared with the carriage for a 12-inch gun?

General CROZIER. The carriage of the 12-inch gun costs $52,000. I estimate that a single carriage for this 16-inch gun would cost $90,000 or $95,000. Of course, if we were building a dozen of these carriages the cost per carriage would be less.

Mr. SMITH. What did this gun cost?

General CROZIER. About $150,000—this particular gun.

Mr. SMITH. What did the 12-inch gun cost?

General CROZIER. The 12-inch gun we expect to build hereafter would be $43,000. We could build the 16-inch gun in quantity for something less than $100,000.

Mr. SMITH. You could build a 12-inch gun and mount it for what it costs to mount this gun alone?

General CROZIER. Practically. The 16-inch gun weighs twice as much as the 12-inch.

Mr. SMITH. It requires you to manufacture special ammunition for this gun?

General CROZIER. Yes; the projectile would be twice as large, and the gun would have twice the power.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION FOR SEACOAST CANNON.

Mr. SMITH. The next item is "For the purchase, manufacture, and test of ammunition for seacoast cannon, including the necessary experiments in connection therewith, and the machinery necessary for

its manufacture at the arsenals." What is the Treasury balance in this item?

General CROZIER. $641,584.55 on the 28th of December.

Mr. SMITH. What is the unallotted balance?

General CROZIER. One hundred and sixteen thousand six hundred and forty-one dollars on the same date. I can add that that has nearly all been allotted since the beginning of the year.

Mr. SMITH. This provides for the completion of the reserve supply by the year 1922?

General CROZIER. Yes, sir; that is putting it off quite a while, you will notice.

Mr. SMITH. In a general way, General, how is it determined what would be a fair reserve of ammunition per gun or per battery?

General CROZIER. The best way in which we have been able to get at it is something like this: We suppose that fleets will not hereafter indulge in prolonged bombardments of shore batteries. They would be about certain to get the worst of it, and they will not be risked in that process. Therefore their efforts in regard to such defenses will be to run by, as Farragut ran by the forts at New Orleans and Mobile. Now, for the head of a fleet to come within range and pass the fortifications and the tail of the fleet to get out of range after having gotten by, if successful, is estimated to require something like two hours; and, therefore, taking into consideration the rate of firing at which these guns might be used during an engagement, we consider that there should be for each gun about two hours' supply of ammunition.

Mr. SMITH. At the gun's maximum rate of speed in firing?

General CROZIER. Yes, sir; at the gun's battle rate of fire, which we take as something less than half the maximum rate obtained in target practice.

Mr. SMITH. That is the standard on which you base all of these estimates of reserve?

General CROZIER. Yes, sir; approximately, thus far.

Mr. SMITH. In such items as this how are estimates made as between artillery and the ordnance—by conference or by report of the artillery to the ordnance?

General CROZIER. I make these estimates. I have had the expressions of the Chief of Artillery, of his advisory board of artillery officers, and of the Board of Ordnance and Fortification, which is composed of artillery and ordnance and engineer officers and one civilian. These united in the estimate of the number of rounds of ammunition which had to be provided per gun. Then, recently I have formed a board in conjunction with the chief of the Bureau of Ordnance of the Navy for the purpose of considering the same subject, and that last-mentioned board has devised the plan which I have just given you, and that corresponds quite closely with the figures which had been previously agreed upon between these different organizations, including the artillery, the ordnance, and the engineer officers.

Mr. SMITH. Now, on this subject of ammunition, the projectiles would be the slowest in the matter of procurement in case of emergencies?

General CROZIER. Of any class of ammunition; yes, sir.

Mr. SMITH. The powder could be procured in a reasonable length of time?

General CROZIER. When I said of any class of ammunition I meant any class of projectiles. The powder can not be procured in a short time. It takes six months to procure any quantity, no matter how small, because it takes six months to dry the powder after the other processes of manufacture have been completed. The other processes are rapid, requiring only a short time.

PURCHASE, MANUFACTURE, AND TEST OF INSPECTING INSTRUMENTS, RANGE FINDERS, ETC.

Mr. SMITH. Now, gentlemen, if there is nothing further on this item, we will go to the next, on page 10, in the middle of page 10, "For the purchase, manufacture, and test of inspecting instruments for the manufacture of cannon, carriages, and ammunition; range finders and other instruments for fire control in the fortifications and in field batteries, and the machinery necessary for their manufacture at the arsenals." Now, General Crozier, does this item include the purchase and manufacture of range finders?

General CROZIER. Yes, sir.

Mr. SMITH. The language is a little ambiguous there. It says, first, "For the purchase, manufacture, and test of inspecting instruments for the manufacture of cannon," and so forth.

General CROZIER. Those have always been classed together, although they are different classes of instruments and for different purposes. The only reason for classing them together is that they are all instruments of precision. They are apt to be made at the same place or by the same class of manufacturers. But they are not for the same purposes.

Mr. SMITH. From the language of the bill I was not able to tell whether they were for inspecting instruments for the manufacture of cannon or inspecting instruments for the manufacture of range finders, or for range finders themselves.

General CROZIER. Having the semicolon after the word "ammunition" was thought to indicate that the inspecting instruments were for use in the manufacture of the articles preceding the semicolon.

Mr. SMITH. Of course the law books say that punctuation marks are comparatively worthless in the interpretation of statutes. [Laughter.]

Mr. BRUNDIDGE. I see in the latter part of that item "range finders and other instruments for fire control at the fortifications and in field batteries, and the machinery necessary for their manufacture at the arsenals." Now, that language is identical with the language on page 2, the latter clause of the item there, "for the purchase, manufacture, and test of range finders and other instruments for fire control at the fortifications, and the machinery necessary for their manufacture at the arsenals." You will observe that is the language on page 2 of this bill as well as in this item on page 10. What I desire to know is whether the only addition here is not "and in field batteries?" It seems the field batteries are added to this language here, which is the only difference here between that and the language on page 2. What is the reason why this part of the appropriation, so much of it as is

intended for range finders and other instruments of fire control, is not covered by the item or estimate on page 2?

General CROZIER. I do not understand why, on page 2, you have that item, "For the purchase, manufacture, and test of range finders," because I buy all the range finders.

Mr. SMITH. "And other instruments of fire control," it says.

Mr. BRUNDIDGE. It is the fire-control proposition that I am desiring information on more than any other feature, because we have gone into that several times heretofore, and I have never been just exactly satisfied as to that fire-control proposition.

Mr. SMITH. Suppose we remark, gentlemen, as for a possible amendment, to strike out the words "range finders and other instruments for fire control" on the third line from the bottom of page 2, just simply as a query to propound to the Engineer Department as to why those words shall not be stricken out?

Mr. GRAFF. Then you would strike out "for the purchase, manufacture, and test?"

Mr. SMITH. No; there are other instruments besides the range finders that are purchased by the Engineer Department.

General CROZIER. Yes; purchased by them and purchased by me. For instance, there are other instruments than range finders purchased by the Signal Corps. For instance, telephones and telautographs, which the Signal Service provides, and I have platting boards and specially constructed rulers which are used in the same connection in addition to range finders.

Mr. SMITH. This is not in your branch. But taking this item on page 2, do you see any reason why it would not read properly if we strike out the last four words in the fourth line from the bottom, "range finders and other instruments?"

General CROZIER. I do not think any difficulty would arise from that.

Mr. KEIFER. We talked about that before, did we not?

Mr. SMITH. No; we talked about the item itself; but this recurrence of the same wording was not called to our attention until Mr. Brundidge called it up.

Now, returning to the particular item on page 10, General, what is the available balance?

General CROZIER. $98,085.88, and the unallotted balance at the end of December was nearly as large—$74,747.70. That has been reduced somewhat since; not very greatly, however. The instruments for which I want it—that is, from the unallotted balance—are well known, however. I could tell you what they are.

Mr. BRUNDIDGE. Is any part of this appropriation contemplated to be used for the installation of fire control?

General CROZIER. Oh, yes, sir; practically all of these instruments, at least much the larger part of them, are for use in fire control, both for seacoast fortifications and for field batteries.

Mr. SMITH. Suppose we decided on quite a material cut of the appropriations for fire control. Would that allow of any cut in this item?

General CROZIER. Yes, sir; if you concluded to cut it materially, it would allow some reduction in this. I will say that of this $150,000 which I ask for here $90,000 is for instruments for use in connection

with the Field Artillery, and $60,000 is in connection with the Coast Artillery, so that if you will cut off the Coast Artillery, you will cut into my $60,000.

Mr. SMITH. And if we cut the fire control materially we would also cut the $60,000 relatively?

General CROZIER. If you cut the fire control for coast fortifications, then you would cut into my $60,000.

Mr. SMITH. You have a system of fire control now for Field Artillery, have you not?

General CROZIER. Yes. Of this $150,000 I mean $90,000 for fire control of Field Artillery; but the fire control for both the Field and Coast Artillery is considered to be of importance.

Mr. SMITH. Yes; we realize the importance of seacoast fire control; but the committee have been inclined, some of its members, at least, to cut this down, because no standard system has yet been reached upon fire control to warrant the rapid spread of it and the completion of it at other places. It seems that further tests are required before we can have a standard system. That is the only question before the committee. We all heartily concur in the necessity for the fire-control system and its rapid development.

Mr. BRUNDIDGE. There is one other item also which I have been very much perplexed over. I have opposed this item before, because it has never been completed at any one place. General Mackenzie gave us some information about that, but you will remember that when this matter first came before the committee the estimates were $1,200 to a gun to install this new fire control. Then it rose to $4,000 per gun, and now the information is that it will likely exceed $10,000 a gun, and now nobody knows or can give definite information. The practice is going on of making the appropriations and installing this fire control at several different places with that kind of information before the committee, and I say, frankly, I am very much opposed to it.

General CROZIER. I do not know whether it will affect your view in regard to this item if I say that my portion of the necessary expenditure is the most definitely known. These instruments which I buy—the range finders and the platting boards, and so forth—are the most likely to be needed with whatever system is finally used.

Mr. BRUNDIDGE. That is what we wanted to find out.

General CROZIER. But, of course, there is no necessity of providing them in advance of the other elements of the system.

Mr. SMITH. It is not so much a question of cost, whether $400 or $1,200 or $4,000 per gun. It still ought to be established what system is to be adopted. I think many of the members of this committee take the view that until the Department knows what it will cost it can not be considered as a definite plan. The lack of accuracy in estimates as to what it will cost is an evidence of the lack of a standard plan established. We think we should wait until the system has become a standard before vast sums of money are spent to establish it. We think these large sums should not be appropriated until this has become a developed system.

General CROZIER. I have seen it in operation at coast fortifications very successfully and impressively, and the gentlemen who were there using it were quite well satisfied that it had been developed to a satisfactory stage. Now, of course we must remember that they had

not used it very long and that there is a possibility of its being improved still further. I would say, I think without hesitation, that the system at the stage to which it has been developed now is good. It is satisfactory. Even if it should not be improved any further, it would greatly increase the usefulness of the guns we have mounted, and it would increase the distance at which they can do accurate firing. Therefore we can congratulate ourselves that we have something which is satisfactory. Whether or not this has been in use long enough to say that the stage of rapid improvement has been passed it is difficult to decide.

Mr. SMITH. The thought with the committee is this: That every time one of these appliances is installed, every time one of these stations is established, improvements are discovered in the actual operation and changes are made. Now, if you attempt to install at eight or ten places at once you are in danger of wasting money in putting in and completing things that are not fully up to an ultimate standard. We think it would be certainly wise to finish this system, say, at one point or at a definite place in order that its defects may be determined and improvements made, and after that is done put the system in operation at another place, and so on gradually, and not put in an immature plan at every place at once.

General CROZIER. The people principally concerned in it, the artillery, would scarcely consent to it being considered an immature plan now.

Mr. SMITH. We do not regard it exactly as immature or as being ineffective. It is effective. But the Artillery send up new plans very often and are constantly making changes in the primary station rooms and the buildings that are necessary, and no standard plan seems yet to have been arrived at. There has not been sufficient experience to develop it. For example, they want a different-sized room now than they did a year ago for each purpose nearly. Constant changes are being made, and we think we ought not to put in a great quantity of money in things that will be torn out again.

Mr. KEIFER. We are in harmony entirely about that, because they have been doing work that is all effective at those places in establishing this system, and it is not all temporary work, though part of it seems to be so.

General CROZIER. In regard to the fire-control system for the field artillery, I can say that that is comparatively new. It will undoubtedly be remembered by some of the members of the committee that during our civil war—during the latter part of the war—the real efficiency of artillery to a certain extent was questioned, and it became rather the fashion to say that the effect of artillery was more moral than physical or anything else. The old soldiers recognized that it did not do very much harm, and that the musketry fire was the thing to be dreaded. However that may be, the principal reason why the artillery fire was not more effective than it was, however effective it was or was not, was the inaccuracy of the firing. The range of the artillery was always greater than that of the musketry fire, and, as a consequence, since both were aimed and directed by the same human eye, and both used substantially the same kind of sight, namely, an open sight, without special assistance from refined optical instruments, it was oftentimes the case that it was supposed that the artil-

lery projectiles were attaining their object with great accuracy, when, as a matter of fact, they might be 50 yards short or 175 yards over, and were actually doing very little damage.

Mr. KEIFER. Was not that so with the infantry, too?

General CROZIER. Yes; but the distances were not so great, however, and consequently the errors were not likely to be so great.

Mr. KEIFER. I think they were equally so.

General CROZIER. Do you think so?

Mr. KEIFER. Yes. There was more chance of killing a man with artillery than with musketry.

General CROZIER. Under the methods that are used at present and which were carried to greater perfection in the Russo-Japanese war than in any other war that has been fought, the observations on the result of artillery fire have been aided not only by the use of good optical instruments, but also by observations from a station which was some distance removed both from the battery and from the target, being placed off to one side. By that means the fire of the field artillery has been very greatly improved and made very much more accurate and more effective than before, and its importance has relatively increased.

Mr. SMITH. We are fully convinced of the efficacy of seacoast fire control—all of us. The only query is whether or not a standard system has been established so as to justify us in authorizing you to go on and develop it everywhere, or to admonish us to go slow and let these improvements be made in some one place until a proper standard has been reached.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION, SUBCALIBER TUBES, ETC.

Passing to the next item, page 11, "For the purchase, manufacture, and test of ammunition, subcaliber tubes, and other accessories for seacoast artillery practice, including the machinery necessary for their manufacture at the arsenals," what is the Treasury balance in this, General?

General CROZIER. The Treasury balance on the 31st of December was $616,626.05.

Mr. SMITH. What was the available balance?

General CROZIER. $37,360.44. This appropriation, as is evident from the wording of the item, is used for the conduct of the annual artillery target practice of the seacoast artillery.

Mr. SMITH. Each year we have been giving you about $350,000, or in that neighborhood most of the time, for this purpose. As a matter of fact, have you not had a reasonable amount of practice with that, General? Do you think there has not been sufficient practice for the good of the service? Would not an equal amount be sufficient? Have you really felt any deprivation in the practice?

General CROZIER. The practice has been very good. You have given me about seven-ninths of what I asked for, so that I have had seven-ninths of perfect satisfaction, in accordance with my own estimate; which, of course, is pretty good.

Mr. SMITH. Do you not feel, General, that if we give you as much as usual it would not impair the material efficiency of the practice?

General CROZIER. Perhaps I had better explain the system under which this estimate is made up. There is an order which prescribes the exact allowance in the number of rounds to each company of coast artillery. Now, I do not think that allowance is excessive. For instance, each company practicing with a 12-inch gun fires 11 rounds a year. That is certainly not excessive. Each company which practices with a 6-inch gun requires 13 rounds a year. Each company firing with a 12-inch mortar fires 38 rounds a year. Now, those are not excessive amounts, and to carry on that scheme with all the companies constituting the Coast Artillery will add up to a definite sum, which is this that I have asked for.

Mr. SMITH. Let us understand that, General. I presume it is perfectly plain. Does each company do all this firing?

General CROZIER. No; each company does only a certain class. The company that deals with the 12-inch rifle, for instance, does not have any practice with the 6-inch gun or the mortar.

Mr. SMITH. What is the practice under your modern fire-control system? Does it relate to those in charge of the fire control or to those in charge of the guns?

General CROZIER. Both sets of people receive considerable benefit from the practice, because they work together, and one set has to do what they are directed to do by the other set; and it is just as important that people should learn to do what they are told as to know how to tell what should be done.

Mr. SMITH. Is it as difficult to operate the guns under the modern system of fire control as it was under the old system?

General CROZIER. It is much more easy to be certain to attain a good result with the new system than with the old.

Mr. SMITH. Does the man at the gun influence the result at all under the new system? Is it not a matter of absolute mathematical accuracy to fire the gun accurately as indicated by those in charge of the fire control?

General CROZIER. Those at the guns have got to be practiced in celerity of operation and in loading and firing. One result of that practice is that the rate of firing is very considerably increased. We now fire a 12-inch gun and have fired it at the rate of two rounds per minute. Five years ago that was unheard of and unthought of. Nobody thought we could fire such a gun more rapidly than once in a minute and a half. That is simply due to practice.

Mr. SMITH. The man who fires the gun fires it absolutely as directed by the fire-control system?

General CROZIER. Yes; if he has good practice and skill and celerity in setting the gun exactly at the elevation given to him, in setting his little deflection scale in the sight in exact accordance with the direction sent to him, and then in sighting with the sight exactly at the object. You probably understand that with guns, as distinguished from mortars, the usual practice is to sight the guns for direction by looking through the sight at the object. Then we allow for the deviating influence of wind and the natural deflection due to the shot on account of its rotation, which carries it off to one side a little bit; and we allow for certain other disturbances, by setting the sight over a little to one side or other by what is called the deflection scale. The amount to be set over in one direction or other is transmitted from

the central station as the result of the observation of the last preceding shot, and is the result also of the observation of the probable effect of the wind, which is blowing in a certain direction with a certain force. The man at the sight gets the deflection and sets his sight at that and afterwards sets the sight on the object.

Mr. KEIFER. Does he not have to have the skill to do that and the other man gives the theory on which it is done?

General CROZIER. Yes. He must be a skilled man. Each individual part of the process is a simple process when you know it.

Mr. SMITH. The impression has been left on my mind from these numerous hearings on the subject that under this new system of fire control the gunner was practically governed, or entirely governed, by the information furnished through the system of fire control; that he knew the elevation and the azimuth absolutely, and there was no sighting of the gun whatever by him except as he adjusted it mechanically at the elevation given him through the fire control.

General CROZIER. That is true except as to the azimuth. The usual practice is not to give the degrees in azimuth and set it to that, except for mortars. For the guns you give the deflection in azimuth and then the gunner sights at the object. Mortars are down behind high parapets, you know, and it is impossible to see from the pit they are in. Therefore the figures are set from the central station, and they set them at those figures in the pit.

Mr. SMITH. There is apparently more left for the gunners to do in seacoast cannon than we understood from previous hearings on this fire control. As I understand now, under the ordinary system of firing seacoast cannon, as to azimuth, the man is governed practically by his eyesight at the gun?

General CROZIER. That is case 2. They divide the system into three cases. Case 1 is that in which both the elevation and direction are given at the gun by direct sighting. An estimate is made at the gun of the range, and the elevation is given as judged to be proper for that range, and the direction is given by the sight on the gun.

Case 2 is that in which the elevation is sent from a distant fire-control station, from the determined range. The gun is then set at that elevation, and the man at the gun does not concern himself with the question of whether the target is 500 yards off or 5,000. But he does set his little deflection scale for the amount that the projectile is going to drift, and he sights directly at the object.

Then case 3 is when both the direction and elevation are sent from the fire-control station.

Mr. KEIFER. Nobody but a skilled gunner could do the latter?

General CROZIER. He has to have practice in reading his little pointer, which has a thing called a vernier scale on it, and it takes skill and practice in using it.

ALTERATION AND MAINTENANCE OF MOBILE ARTILLERY.

Mr. SMITH. Now, we will pass to the item on page 11 at the bottom, "For the alteration and maintenance of the mobile artillery, including the purchase and manufacture of machinery, tools, and materials necessary for the work and the expenses of the mechanics engaged thereon." Does that include, General, such mobile artillery only as is used in connection with the seacoast defense?

General CROZIER. No, sir. This is the mobile artillery that is used in connection with the field army.

Mr. SMITH. And includes mobile artillery used in connection with seacoast defense, does it?

General CROZIER. No; the next item but one covers that, "For the alteration and maintenance of the seacoast artillery." I have distinguished here the mobile from the seacoast artillery.

Mr. SMITH. We were talking a little while ago not only of the fact that you had not only some rapid-fire guns, but also field guns in connection with fortifications.

General CROZIER. Very little of it.

Mr. SMITH. Would you regard that as properly coming in this item or in the item at the bottom of page 12?

General CROZIER. I should think it would come in at page 12; but I could see, as the item reads, that the mobile artillery of larger class—larger than that used with the field army, and used on the fortifications—could be kept in repair from either one of these items. I think that is not a very bad state of affairs, for, in the first place, there is not much of it, and in the second place, on necessity we would take mobile artillery from either class and assign it to the other, although we have a distinct idea and have estimates corresponding to the amount we would use for both purposes.

You will notice, Mr. Chairman, that if you will give me an appropriation for this purpose it would be something that you did not do last year. You did not meet my view last year. You did not make any appropriation for this purpose. But, now that we are getting the new field gun into the hands of the troops, and as it will require more care to keep them in order than was required to keep the old guns in order, this item becomes increasingly more necessary.

Mr. SMITH. What is your Treasury balance under this item?

General CROZIER. The Treasury balance is $1,403.06, and the balance which I have available is $784.82. The rest I have mortgaged.

Now, included in this $80,000 which I ask you to let me have is an amount for overhauling and putting in proper repair the 3.2-inch guns which have been turned in from the Regular Army, as they have been supplied with the new 3-inch gun, because for a number of years to come that will constitute our principal reserve, and it is not expected to expend a great deal of money in the overhauling.

Mr. BRUNDIDGE. I see that the appropriation for 1905 was $11,000, and for 1904, $8,000.

General CROZIER. Yes. For this year they did not give me anything.

Mr. BRUNDIDGE. What inconvenience has your department suffered by reason of not having a larger appropriation under this item?

General CROZIER. We have let the 3.2-inch material run down. We were about to take it out of the hands of the troops anyway.

Mr. SMITH. You had a larger surplus at the end of last year, had you not? I think we cut you out last year because your balance was consolidated.

General CROZIER. I have not a note here on that, but I am inclined to think that that was the case. I did not spend much on this material, which was in the hands of the troops, because I intended to re-

place it, and I thought we could expend the money to better advantage when the material was got back in our shops.

Mr. FITZGERALD. The note says: "This estimate also includes the cost of altering one hundred and twenty 2.95-inch mountain guns to 3-inch diameter." You have a large reserve supply of ammunition for this gun at their present caliber, have you not?

General CROZIER. Yes.

Mr. FITZGERALD. If you change the caliber that will become entirely useless, will it not?

General CROZIER. You see, the change of caliber is very slight. It is five one-hundredths of an inch. I can change the ammunition to suit by putting a little larger band on the projectile.

Mr. FITZGERALD. So that at slight expenses you can use the reserve ammunition to suit the new caliber?

General CROZIER. Yes.

Mr. KEIFER. The ammunition for ordinary field guns can not be used in a mountain gun?

General CROZIER. The projectile can. But uses too much powder for the other. It would kick a mountain gun about as fast one way as the projectile would go the other way.

PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION, SUBCALIBER TUBES, ETC., FOR MOUNTAIN, FIELD, AND SIEGE PRACTICE.

Mr. SMITH. The next item is, "For the purchase, manufacture, and test of ammunition, subcaliber tubes, and other accessories for mountain, field, and siege artillery practice, including the machinery necessary for their manufacture at the arsenals." I wish, General, you would explain to the committee what is meant by subcaliber tubes.

General CROZIER. You understand that in order to do as much actual firing with these pieces as would be beneficial there would be involved a considerable expenditure of pretty expensive ammunition. To avoid this we use a tube, even as small as of musket caliber. The subcaliber tube is small enough to use musket ammunition. Then we go through the drill and the pointing just as we do with the larger gun, but we fire the ammunition through this smaller tube. The firing pin hits the smaller cartridge instead of the larger one. In that way we get the considerable benefit which comes from the artillery practice, and it relieves us of the expense which otherwise would have to be incurred in acquiring the same degree of skill.

Mr. SMITH. We understand the subcaliber tube is a tube which is inserted in the larger gun.

General CROZIER. Yes.

Mr. SMITH. Not a tube from which the actual firing takes place?

General CROZIER. Yes; of course. We use some ammunition for the gun of the size for the gun itself; but this subcaliber tube permits us to get more training at less expense.

Mr. SMITH. In this item, as in the other, you ask for quite a considerable increase for practice. Do you not think that the practice allowed last year under this item was fairly adequate—not to say ideal, but fairly adequate?

General CROZIER. Last year, I think, we had $77,000. Now I have asked this year for $100,000. The increase is not very great.

Mr. SMITH. It is about one-third.

General CROZIER. Yes; we have given the people a new gun. We have adopted new methods of target practice largely by the use of this indirect pointing and the utilization of the fire-control and direction system, which is new to the field artillery. I think that they ought to have an additional amount of practice under these new conditions, sufficient to acquaint them with the new material which has been put in their hands.

Mr. SMITH. Was not the new field gun in the hands of the Regular Army during the practice of last summer?

General CROZIER. The very large part of the regular batteries did not get the new gun until after the 1st of July.

You may be interested, Mr. Chairman, in knowing that the target practice for the battery which is intended to be covered by this appropriation, for all the batteries, is intended to consist of firing 180 shrapnel, 15 common shell, 15 high-explosive shell, 300 blank cartridges—which are used in drill, and are intended to accustom the horses, and so forth, to the sound—and 2,000 rounds from these subcaliber tubes. I will add that the 2,000 rounds is the smallest item of the whole, because of the cheapness of the ammunition.

Now, that is not an abnormal amount to be expended by a four-gun battery in a year.

Mr. SMITH. Now, take the item in the middle of page 12, "For the purchase, manufacture, and test of ammunition, subcaliber tubes, and other accessories for mountain, field, and siege artillery practice, including the machinery necessary for their manufacture at the arsenals." What is the Treasury balance under that?

General CROZIER. $53,067.51. The unallotted balance at the end of December was $23,098.83, which has been still further reduced since then.

Mr. SMITH. Is there any considerable amount of money on hand under these two practice items, or purchased and not delivered yet and allotted, so that it is taken out of your fund? Is there any considerable amount of ammunition on hand covered by these two practice items in possession of the Government?

General CROZIER. No, sir; we fire it all away from year to year. There is very little on hand.

Mr. KEIFER. You have no reserve of it?

General CROZIER. No.

Mr. SMITH. I do not mean a technical reserve, but have you any balance on hand?

General CROZIER. No.

Mr. SMITH. There must be a large amount ordered and available. For example, this $99,000 which you got for 1906 must be either in ammunition or in money available. Whatever the Treasury balance is, at least that much is available for practice?

General CROZIER. Yes. If you cut off this appropriation, the practice would not stop at once, but it would stop at a period later on. I have sufficient funds and sufficient ammunition on hand and contracted for to carry on this practice for practically a year.

Mr. SMITH. What is the nature of this practice ammunition? Does this take long to get after it is ordered?

General CROZIER. All the ammunition which is used in practice is of the same kind as the service ammunition. I should say the am-

munition used in the subcaliber tubes is not service ammunition for the guns in which the subcaliber tubes are inserted, but it is service ammunition—for the musket, for instance.

Mr. SMITH. Is it No. .30?

General CROZIER. Yes; it is caliber .30. It is exactly the same ammunition that we use for business in the musket.

Mr. SMITH. What I was trying to get at was whether or not we were really ahead or had to keep a year ahead in this supply of practice ammunition. Suppose we postponed this to the 4th of March next year, would it take too long to get that ammunition?

General CROZIER. If you would not appropriate this year, I would run out of ammunition before I could procure ammunition from the appropriation to be made next year.

Mr. SMITH. What time of the year does the practice usually take place?

General CROZIER. In the summer season.

Mr. SMITH. And in the latter part of February, say, it would not be safe to obtain ammunition for the following year?

General CROZIER. No, sir; it would not.

Mr. KEIFER. All of this practice is not in the summer season for this field artillery?

General CROZIER. Some of the subcaliber tube practice takes place at other seasons.

Mr. KEIFER. Siege artillery, is not that practiced with in the southern country?

General CROZIER. Yes; I think in the South the real summer season is avoided, down in the southern country, and they have their practice in the spring or autumn or winter.

Mr. KEIFER. So that reverses the time. Up North it is in the summer?

General CROZIER. Yes.

ALTERATION AND MAINTENANCE OF SEACOAST ARTILLERY.

Mr. SMITH. Take up the next item, "For the alteration and maintenance of the seacoast artillery, including the purchase and manufacture of machinery, tools, and materials necessary for the work and the expenses of the mechanics engaged thereon." What is the Treasury balance on that?

General CROZIER. Everything available for that service is $743,368.38. The total applicable to this class of service that I am asking this appropriation for is $743,368.38.

Mr. SMITH. What is the unallotted balance?

General CROZIER. The unallotted balance at the end of the year was $551,188.02.

Mr. SMITH. Now, General, why do you need anything for that item this year?

General CROZIER. I recognize, Mr. Chairman, that that needs a little explanation. I had at the end of December quite a large balance, and I am nevertheless asking now for quite a large appropriation. The principal expenditure which I intend to make, both with the balance which I have on hand unallotted and from the appropriation which I am asking for, is for the purpose of making an alteration in all the mortar carriages that I have got in service, strengthening

them, so as to enable us to use the mortars at a greater power than they were designed for, and for which everything else is strong enough except the carriage. This will avoid building a new carriage and avoid the temptation to replace these mortars with more powerful ones—that is, with more powerful material throughout. I expect to use of this $551,000 or a little over, the balance that I had at the end of the last calendar year, something like $385,000 for this purpose alone, and I expect to use out of the $531,000 which I am now asking you to appropriate, $240,500 for the same purpose. The rate at which I contemplate going in effecting this alteration of the 391 mortar carriages which are now in service will complete the process in six years and will cost ultimately $1,368,000.

Mr. SMITH. If that is true, why is there any necessity for the appropriation this year? You have $743,000 of a Treasury balance and $551,000 available. Is not that a great deal more than you would have any use for in the next current year, General?

General CROZIER. No, sir. I expect to spend that quite rapidly during the next year. One reason why it has accumulated in this way is that I have not thoroughly tried out, until quite recently, this method of alteration of the mortar carriages, and I did not want to start it until I knew it was going to answer, and after having done that it was necessary for me to make such little modifications as our experience with the method showed to be necessary, and I have just given the first considerable order for the alterations to take place within a fortnight.

Mr. SMITH. You said the alterations would be completed in six years. If you have $640,000 on hand and $541,000 unallotted, can you not get the balance you need after this year without loss of time materially?

General CROZIER. It will simply put this process off a little longer. I will have no difficulty in expending that amount of money, Mr. Chairman, because I can utilize private industry in effecting this alteration. I will get most of the material for effecting the alteration from private plants, and I can give large orders, and I will have no difficulty in spending the money.

Mr. SMITH. You have got now a whole year and a half of money on hand. In fact, we never gave you as high as $200,000 for any year for this appropriation until two years ago.

General CROZIER. That is right.

Mr. SMITH. In that time you have had a million dollars, of which only $260,000 or $270,000 has been spent and about $200,000 more apportioned. Now, if this is a six-year plan, I do not yet really understand why it is necessary to appropriate more money at this time, nor do I understand what would be the object of allowing those outside properties to relieve your own plant, not busily employed after the business had been run through the outside plants.

General CROZIER. You will notice that you gave me last year $560,000, and the year before $500,000. Now, I have got left—I had left at the end of December—$551,000; so, you see, I am not a year behind. There is no use in considering that $743,000 which is in the Treasury, because the difference between that and $551,000 is mortgaged. It is not available.

Mr. SMITH. But it is work for you to do in your shop?

General CROZIER. Yes; or by private manufacturers.

Mr. SMITH. It is work you have to do yet?

General CROZIER. Yes.

Mr. SMITH. You have still to occupy your shop with that $200,000 worth of work?

General CROZIER. I have started the work going. As a matter of fact, that $551,000 is at the present date down to $393,000, owing to orders I have given since the first of the year.

SATURDAY, *January 27, 1906.*

STATEMENT OF BRIG. GEN. WILLIAM CROZIER, CHIEF OF ORDNANCE—Concluded.

ALTERATION AND MAINTENANCE OF SEACOAST ARTILLERY.

Mr. SMITH. Is there anything further that you wanted to add on that item on page 12, General?

General CROZIER. Yes, sir; I would like to say this: As I told you yesterday, I expected to use of this $531,000 I have asked for $240,500 for altering 12-inch mortar carriages after the manner which I explained. We were discussing that particular estimate in this item, and I informed you that I expected to carry this work on at such a rate as to finish it in six years. Now, I do not wish to be understood as representing to the committee that we will be in a state of comfortable security if we complete this work of alteration in six years and in inadmissible jeopardy if it takes seven years. Of course that is not the case. If you choose to cut out part of this $240,000, so as to take a longer time, I will go ahead and take a longer time in doing the work.

Mr. SMITH. Two hundred and forty-one thousand dollars is the mortar matter?

General CROZIER. Yes, sir; I expected to use $240,000 out of this appropriation now asked for and $384,000 out of the balance which I have on hand for this purpose during the coming year. My unmortgaged balance is $551,198.02, and I expected to use $240,500 for mortar-carriage purposes out of the $531,000 which I am now asking for.

Mr. FITZGERALD. You say that you have now unallotted $551,000, which is practically the entire appropriation for the present fiscal year? Now, that can not be expended between now and the 1st of July?

General CROZIER. It can not be expended, but the work which calls for its expenditure can be ordered and will be and can be put in progress.

Mr. SMITH. One of the difficulties that this committee has to deal with is that much of the work under the fortification-bill appropriation takes a long time to complete. They are not allowed to make contracts to do anything until they get their appropriation covering it, and, as a result, we sometimes unfortunately find that it is necessary to appropriate two or three years in advance in order that the work may be done. That is one of the embarrassments of this committee.

POLICY OF MAKING CONTRACTS FOR CERTAIN WORK.

Mr. FITZGERALD. Would it be feasible for us to authorize the making of contracts for certain work——

Mr. SMITH. This committee has not the power to authorize contracts; we only have the power to make appropriations authorized by law.

General CROZIER. Pardon me, that has been done; but only on one occasion that I remember of by this committee. Nearly fifteen years ago the Ordnance Department was authorized to make a contract for 100 guns with the Bethlehem Steel Company, and the appropriations to meet that contract, as the payments became due, were made from year to year.

Mr. SMITH. That is the next item of the old bill. It certainly seems to me that we have no authority under the rules of the House to authorize contracts from this committee. I do not know of any such authority in the House of Representatives.

Mr. FITZGERALD. It appeared to me if we knew what contracts were to be made then we could give them each year the necessary money. We may appropriate a lump sum to-day, and it will be a year before we can be ready to spend it.

Mr. KEIFER. It would be difficult for us to tell what sort of a contract ought to be made; it might lead to confusion.

Mr. SMITH. The next item in this bill is the somewhat well-known 100-gun contract with the Bethlehem Steel Company.

General CROZIER. That contract is completed.

Mr. SMITH. Then this item should be dropped from the bill.

General CROZIER. Yes, sir; for the first time in fifteen years. As a matter of fact, we have supplied ourselves now with guns of the types furnished under this contract very well. We have all of the guns for the emplacements that have been provided, and a few more besides.

Mr. SMITH. About how many of these guns furnished under this contract are unmounted?

General CROZIER. Of the classes of guns called for in this item were eighty-six 8-inch guns, one hundred and sixty-two 10-inch guns, one hundred and fifty-seven 12-inch guns. Now, I have of the gun carriages seventy-three 8-inch, one hundred and thirty-five 10-inch, one hundred and six 12-inch. Subtracting one set of numbers from the other, we see that we have an excess of thirteen 8-inch guns, twenty-seven 10-inch guns, and fifty-one 12-inch guns.

Mr. KEIFER. Have you the appropriation to furnish those carriages for these guns?

General CROZIER. No, sir; I have included in these figures all of the carriages for which I have appropriations.

Mr. KEIFER. Why should you not have carriages for those extra guns?

General CROZIER. The appropriations have not yet been made for the emplacement of these guns, and we keep the carriages along in equal number with the emplacements. The policy of completing these guns in excess of the number of emplacements provided for was one I found in existence when I came into office four years ago. I immediately stopped estimating for these guns, and there have been none appropriated for in several years past. The 8, 10, and 12 inch

guns we have discontinued the manufacture of now. One of the results of this surplus of guns is that I had guns already built for the supply of the additional emplacements for the insular possessions within the last two or three years, and each year I have come to you and asked you for authority to use some of these guns in the fortifications of the insular possessions, which you have provided for; and I am asking it this year, and a little later on in the bill you will come to the exact number of each gun which I am asking authority to use.

Mr. FITZGERALD. Were these guns built to be used at some different points in the United States?

General CROZIER. Yes, sir.

Mr. SMITH. Not at specific points?

General CROZIER. Not at specific points; no.

Mr. SMITH. Have you exceeded the number required?

General CROZIER. No; we have not exceeded the number required for the Endicott plan; we are considerably below that still, with all of the guns we have. We are not up to the requirements of the Endicott plan, and we are not up to the requirements of the approved plans which have thus far been made in general accordance with, and in slight modification of, the Endicott plan.

Mr. FITZGERALD. Can you state how many guns we have authorized to be used out of these surplus guns that have been designated in the insular possessions?

General CROZIER. Three 10-inch guns and two 12-inch guns.

Mr. SMITH. There is no appropriation involved in this item, and we will pass to the next item.

PROVING GROUND AT SANDY HOOK—CURRENT EXPENSES AND MAINTENANCE.

Mr. SMITH. The next item is for the proving ground at Sandy Hook. What is your Treasury balance under this item, General?

General CROZIER. I haven't the Treasury balance here, but the unallotted balance to-day is $509.96.

Mr. SMITH. That is to date.

General CROZIER. That is to date, January 22, the end of last week. I have this made out every week. I can send that down to you, in order to make your figures consistent right through the bill. You ought to have it.

Mr. SMITH. Has there been a large allotment in the last few weeks?

General CROZIER. No very large allotment; this is for the general maintenance of the proving ground, and I can and do allot a large proportion of it early in the year.

Mr. SMITH. So that this allotment has not been materially changed since the 22d of December?

General CROZIER. Not materially changed. It is not very different from the figures I am now giving to you.

Mr. SMITH. Now, the only expense that has arisen is $50,000 a year?

General CROZIER. $50,243. The expense has been at that figure for some little time.

Mr. SMITH. Three or four years.

General CROZIER. For three years. That is a very useful item. It is used as a general maintenance fund for the proving ground—pretty much everything.

Mr. SMITH. Are there other proving grounds?

General CROZIER. This is the only one.

Mr. FITZGERALD. Do you maintain a regular force at the proving ground?

General CROZIER. Yes, sir.

Mr. FITZGERALD. Is it all paid for out of this appropriation?

General CROZIER. No, sir.

Mr. FITZGERALD. Is there a civil establishment there, too?

General CROZIER. Yes. I employ there in the neighborhood of 80 laborers and machinists, and in addition to that I have about 95 enlisted men, who fire the guns and put up the powder charges.

Mr. FITZGERALD. Including all clerks?

General CROZIER. I have about 15 or 18 clerks there, part of whom are engaged in ordinary clerical work, and some 8 or 10 are engaged in the clerical work in connection with the proving and testing of guns. All of that has to be most accurately recorded, and when the firing is going on it is necessary to have a clerk out at the gun, who takes specific notes of the points which he is instructed to observe. The officer in charge will be telling him to make a note of this and to make a note of that, in addition to the standard things that he always makes a note of.

Mr. FITZGERALD. Only clerks?

General CROZIER. These assistants are clerks.

Mr. FITZGERALD. Paid out of this appropriation?

General CROZIER. Paid partly out of this appropriation and partly out of the appropriation which I have for the general service of the Ordnance Department.

Mr. BRUNDIDGE. Did you say that you had 18 clerks?

General CROZIER. About that—18 men doing clerical work. They are not always called clerks; some are called assistants in experimental firing, but their duties are clerical.

Mr. FITZGERALD. You sometimes use enlisted men?

General CROZIER. We do not use them for clerks; I use them for the actual work of firing the guns and putting up powder charges.

Mr. FITZGERALD. There is no way by which we determine the number of clerks employed there.

General CROZIER. There is no way by which Congress determines the number of clerks at any ordnance establishment; Congress has placed no limit on it.

Mr. FITZGERALD. Are they civil-service employees?

General CROZIER. Yes.

Mr. FITZGERALD. You have to ask for them from the Civil Service Commission?

General CROZIER. All of them are authorized by the Civil Service Commission.

Mr. FITZGERALD. I would like to ask you this general question: Do you ever have any deficiencies in your Bureau?

General CROZIER. No, sir; we never have any.

Mr. FITZGERALD. Do you make apportionments of these different appropriations under the act of last year?

General CROZIER. Yes, sir; but that apportionment is not always necessary in the Ordnance Department.

Mr. SMITH. It does not apply to this appropriation?

General CROZIER. It applies to some of mine; for instance, it applies to this very one. But I never have any deficiencies. I have sent down this year an estimate of an item to be included in the urgent deficiency bill; it is not because the item is a deficiency, but because the object for which it is needed is immediate, resulting from an emergency caused by a fire. The machine shop was destroyed at Sandy Hook in November, and I needed the money to go on with the work, so I have asked that the appropriation be made in the bill; but not because of a deficiency.

Mr. KEIFER. Your allotment plan is not involved in the apportionment—that is, you never allot all of your money?

General CROZIER. Exactly. Take, for instance, this very matter of clerical labor. I will allot the commanding officers of the Watervliet Arsenal, which is our gun factory, say so much for a chief clerk for a year, and so much for so many clerks at $1,600, $1,400, $1,200, and so on, and he understands that he has got to get along through the year. He can employ these clerks and no others, and he pays by the month.

Mr. FITZGERALD. Do you know why Congress has never specifically appropriated for the civil list at these places as it does at the other departments? For instance, in the various departments it specifically prescribes the number of clerks and fixes the compensation. Now, it appears that in your department at the Watervliet Arsenal or gun factory, at the proving grounds, and at other places where you have a certain fixed clerical force, you determine yourself the number of clerks required, you fix the compensation yourself of those clerks, and we apparently have nothing to do with it. Are you familiar with the reason for this difference?

General CROZIER. Probably I can not account for the difference, but I may be able to say something which would throw some light as to why we do not do it in the Ordnance Department. I think one reason is because it is impossible for anybody to say just exactly how many clerks are needed in advance of knowing exactly what the appropriations are going to be, and what the character of the work required is going to be. A number of years ago it was the practice of Congress to put in some bill—I don't remember what bill it appeared in, but it affected the entire department—a proviso to the effect that the entire sum paid for clerical work in the Ordnance Department should not exceed $65,000 a year. That has not been in the appropriation bills, I should say, for fifteen years at least—well, perhaps, not as far back as fifteen years, but for a good many years. Now, I had no responsibility in the days when that legislation existed for the employment of any clerks, but I saw how the matter went. The clerical payments were not limited to $65,000 a year, because they could not be limited to that amount and do the work that the Ordnance Department was required to have done in the clerical line, and the result of that was that people were employed as clerks but were called laborers. Now, it seems to me if an official is going to absolutely fix the number of clerks that shall be employed, unless he fixes the number undoubtedly in excess of the requirements, the time will arise when more clerks are needed than are provided, and then, I believe from what I have observed in the past, that they will be employed and not called clerks.

Mr. SMITH. The only evil that I could see in this would be that

while other departments were limited as to the number, that you had unlimited discretion, which I presume would be carefully exercised, but it might result in inequality of clerks in the Ordnance Department.

Mr. KEIFER. As to salary?

Mr. SMITH. Yes.

General CROZIER. The point in regard to that is that my discretion is limited by the Secretary of War, but his is not limited. I can pay any clerical salaries that the Secretary of War will approve.

Mr. SMITH. Another thing that would not be wise to exercise is as to whether or not it might not result in inequalities of salaries in your branch of the public service? What is the highest salary paid for clerical service in the Ordnance Department?

General CROZIER. The highest salary paid in Washington is $2,000 a year to the chief clerk of my office, and that is the highest salary paid in the Ordnance Department.

Mr. SMITH. All of this is in the legislative bill?

General CROZIER. That is included in the legislative bill. The highest salary which I pay out of an appropriation not made in the legislative bill is $1,800 a year for clerical work—the chief clerk at each arsenal. I have one such employee at each large arsenal, and only one. At some of my arsenals I have as high as twenty clerks, and the chief clerk gets $1,800 a year.

Mr. SMITH. What would you say, from your general knowledge, as to whether the present price paid for clerical help in your branch is in excess of the sums paid elsewhere?

General CROZIER. I don't think that I pay quite as highly as most other branches of the Government, but I think we all pay more highly than civil employers. I think also that we get better work. I would not allow in my department or to come into my own office or into any arsenal as poorly written letters as many of those I get from establishments with which I deal. Now, if the committee is interested in that question, I can make a brief explanation of the scheme on which I allow the employment of clerks at arsenals.

Mr. FITZGERALD. I would like to have the General make a statement of that kind.

General CROZIER. I will say that I attempt, by the exercise of general judgment, to determine how many clerks are needed at each establishment in proportion to the business done. Now, I do not know of any very good or reliable formula by which we can calculate absolutely the number of clerks proportionately with the amount of business, the amount of business being determined by a great many elements—the amount of money expended, the number of people employed, the number of different shipments made, pounds of articles manufactured—various elements of that sort enter into it. But I have a good many earnest people at work at these arsenals, officers whom I have confidence in, and I have a formula by which I compare the number of clerks at one arsenal with the number of clerks at another, taking into consideration the amount of business which is done at each, and in this manner I construct a curve, of which we call the abscissas the amount of business done, and in the amount of business done I include all of the items of expenditure mentioned, the shipments, the invoices, the receipts, and everything

that I can think of that enters into the business. The ordinate of the curve is the number of clerks. That enables me at once at a glance to compare the clerical force at one establishment with the clerical force at another, and if we find one establishment very much higher than the other, I call them down. I say: "Why can not you do as well as so and so?" In that manner I am continually making an effort to keep the force down.

Mr. GRAFF. About the clerks at these particular arsenals; if there should be a lessening of the amount of business, there would be a proportionate lessening of the need of clerks?

General CROZIER. Undoubtedly.

Mr. GRAFF. And then again, an increase of business would call for a corresponding increase in the need of clerks?

General CROZIER. Undoubtedly.

Mr. GRAFF. Is not there more elasticity in the system that you now have, and probably more economy in the salaries, than there would be if we fixed a limit in the clerical positions in the Bureau?

General CROZIER. I think so, because if you fixed the positions in the bill I would be striving all the time to be sure that you fixed them high enough so as not to cripple me in clerical force, and I would be making an effort to have you allow me more clerks.

Mr. GRAFF. Would there be any difficulty in getting rid of these clerks when you make an effort to cut down the force?

General CROZIER. I think there would be, because I should be very chary to diminish the clerical force when I knew that I had to get the authority of Congress to increase it again.

Now, going one step further in reference to this matter, having once allotted a number of clerks to an ordnance establishment, I have a fixed scheme by which I grade them; that is, I allow a certain number of $900 clerks, and a certain number of $1,000 clerks, and a certain number at $1,200, $1,400, $1,600, and $1,800, and I have made the proportions in those different grades the same as experience has led us to adopt in my own office here from the grades from $1,800 down to $900.

Mr. SMITH. Do I understand you to say there are 16 clerks at Sandy Hook?

General CROZIER. I think there are 18.

Mr. BRUNDIDGE. You do not mean to say you will cease to employ clerical services when the business slacks and take your chances to get more when the business increases?

General CROZIER. Of course, these changes are not very rapidly made. In fact, the business does not change very rapidly at my arsenals. The appropriations made are more than sufficient for me to keep my arsenals employed at such a proportion of their capacity as we think wise, as a general policy, and I keep them going at that proportion of their capacity continuously, and in addition to that I have money to spend upon work done by private manufacturers, so that the work done at the arsenals does not vary greatly.

Mr. FITZGERALD. Does the work of testing go on continuously at Sandy Hook?

General CROZIER. Yes.

Mr. FITZGERALD. So that these eight or nine clerks in connection with the testing work are practically continuously employed?

General CROZIER. Yes. I think you might say that two hours, possibly, of clerical work are involved in every round fired at Sandy Hook, because it is watched very closely. It is recorded, and the reports are transmitted. That is the object of maintaining the place. The round fired is wasted unless all the information obtained from it is carefully set down and recorded and reported.

Mr. FITZGERALD. While the appropriation for 1906 is $50,243, that is not the entire amount expended at this proving ground for clerks, employees, draftsmen, and so on?

General CROZIER. No, sir; I expended at the proving ground more nearly $200,000.

Mr. FITZGERALD. I thought that 15 or 18 clerks in proportion to $50,000 a year seemed to be out of proportion.

General CROZIER. Yes; it would be out of proportion. I allot for expenditures for Sandy Hook funds from a number of different appropriations. The ordnance service, as I mentioned a moment ago, is partially used for the payment of some clerks there. The Board of Ordnance and Fortification sometimes orders work done. They have no proving ground of their own. I am the officer that does all that work for them, and when they make an allotment, as they sometimes do, of a considerable sum of money for what they consider to be an important experiment I carry that experiment out and use the money which they allot for it in making the expenditures that are necessary to carry it out. For instance, quite recently some important experiments of large projectiles against armor plate have been prescribed by the Board of Ordnance and Fortification, and they made an allotment of between twenty and thirty thousand dollars for the purpose.

Mr. FITZGERALD. That will be expended there at Sandy Hook?

General CROZIER. Yes. My workmen down there will have to set up the armor plates, and put up the backing, and shovel up the sand behind the backing, and run the locomotive, and haul the different things down the beach where this is done, some 2 miles below where the houses and shops are, so that I will myself spend a considerable portion of the sum of money which they have allotted for these experiments. I will spend it all down at Sandy Hook.

OBSOLETE APPROPRIATIONS AND UNEXPENDED BALANCES.

Mr. SMITH. General, before we pass to the next item, I would like to ask you if it is not a fact that there have been made from time to time in your branch of the service a goodly number of appropriations that you never intend to use, and which might well be repealed?

Mr. KEIFER. Or omitted?

General CROZIER. There were in existence last year a number of balances of appropriations which had been made for classes of material which had become obsolete. I then asked this committee to reappropriate, to recommend reappropriations of these balances for the class of material which had replaced those other classes, those classes having become obsolete, and the committee did it.

Mr. SMITH. Take, for instance, the $100,000 you had appropriated for the Isham shell and thorite. Why should that appropriation be carried on your books as available for use forever?

General CROZIER. You will pardon me, Mr. Chairman, if I say that in calling my attention to that there was a little inaccuracy in your question as to this $100,000 which I had appropriated for the Isham shell and thorite. [Laughter.] Congress, in its wisdom, appropriated $100,000 for the purchase of those inventions in case the Secretary of War deemed it wise to make the purchase. The Secretary of War, however, up to the present time has not deemed it judicious to purchase those inventions. [Laughter.]

Mr. SMITH. Because you have not recommended them?

General CROZIER. I have not had the controlling recommendation, Mr. Chairman. [Laughter.]

Mr. SMITH. I notice this Isham shell and thorite, these old friends of the subcommittee on fortifications, are here carried still in the available balance. Are there not others of similar character which, along with that appropriation, ought to be repealed and made available for something else?

Mr. KEIFER. Ought they not to be put back into the Treasury? They are unused funds now in the Treasury.

General CROZIER. In regard to those two items, it is only just to Mr. Isham to say that experiments with his shell have been until quite recently in progress, and negotiations in reference to the continuance of those experiments are still in progress. With regard to the other invention you mentioned—thorite—nothing is now being done.

Mr. SMITH. You claim to have a much superior explosive now?

General CROZIER. Yes.

Mr. SMITH. You have not the slightest idea of taking thorite now?

General CROZIER. The Ordnance Department does not now intend to recommend it.

Mr. SMITH. Of course, so far as the Isham shell is concerned, we have heard a good deal of testimony about it in years past. Of course Mr. Isham has somewhat aroused the sympathies of the committee, but not to the extent of overruling the War Department in the matter of giving further tests. But the query with me was whether there are not other items of similar character the appropriations for which ought to be repealed and not carried perpetually as money available to you on the books of the Treasury Department. To give you another illustration, take the Emery loading apparatus. You seem to have obtained an appropriation of $10,000 for that, which was on hand at least on July 1, 1904.

General CROZIER. By subsequent legislation, Mr. Chairman, all of the several appropriations which related to the Emery gun carriage, and to the Emery loading apparatus, which was practically a part of it, have been placed on a new footing. By direction of Congress a couple of years ago I closed the contract with Mr. Emery for that gun carriage and that loading apparatus, and made a new contract for a new gun carriage, to be paid for with the unexpended balances of the appropriations which had been made up to that date; so that it constituted a new appropriation. I do not understand why there is said to be an available balance under that appropriation, because the matter has been closed out by direction of Congress and a new appropriation has been made of unexpended balances.

Mr. SMITH. So far as I can see, these matters would be here a thousand years, so far as the Department is concerned.

General CROZIER. I would be very slow, indeed, to impugn the highly accurate and skillful methods of the Treasury Department, but, according to my understanding, that unexpended balance of appropriation should be carried in a different way.

Mr. SMITH. This is the last statement from the Treasury to Congress [indicating document]. These matters would be hung up for a thousand years, so far as I can see, unless something is done to eliminate those appropriations for which the objects are entirely obsolete.

General CROZIER. That is not now available in that form for that purpose, but the unexpended portion of it is available for another gun carriage.

Mr. SMITH. This is not for a gun carriage; it is for a loader.

Mr. KEIFER. It is a matter of bookkeeping here—the fact that it is here until expended?

General CROZIER. Yes.

Mr. SMITH. I would ask that you cause an inquiry to be made as to whether there is a considerable number of items, outside the Isham shell, carried as a balance which it is not expected to expend, and inform us, so that something may be done, perhaps, to eliminate them from the Treasury's statement every year for an indefinite

CURRENT EXPENSES, SANDY HOOK PROVING GROUND.

Mr. FITZGERALD. I would like, Mr. Chairman, if the General would send in, some time, a statement of the number of clerks employed at these different places, and their compensation.

General CROZIER. There will be no trouble to do that.

Mr. SMITH. So far as apply to this bill only. We do not want it as to the other bills.

General CROZIER. I do not know that I will be able to comply strictly with your wishes, because some of my clerks are paid partly out of one bill and partly out of the other. I can give you the amount which I allot out of this bill for clerical labor and the total pay of each clerk to whom any such allotment is made, although that total amount may not all come out of this bill.

Mr. GRAFF. Would we not want to know the total amount paid to that clerk as a salary?

General CROZIER. Yes; I can give you the total amounts paid to each clerk, although all his salary may not be paid for out of this bill.

Mr. SMITH. That is all, I think, that can be furnished.

EXPENSES OF OFFICERS TEMPORARILY EMPLOYED, SANDY HOOK PROVING GROUND.

The next item is for "The necessary expenses of officers while temporarily employed on ordnance duties at the proving ground and absent from their proper station, at the rate of $2.50 per diem while so employed, and the compensation of draftsmen while employed in the Army Ordnance Bureau on ordnance construction." What is the Treasury balance in this item, General?

General CROZIER. I have not taken that off, sir. I have not brought it down to you.

Mr. SMITH. This is not an item in which there are any contracts? The draftsmen there come up to the average for clerical hire?

General CROZIER. They have for a number of years past. I may say, in fact, that the expenses for these items exceed this amount. I employ certain draftsmen in the Ordnance Office in Washington whose work is very general and for the compensation of whom I need a general appropriation. I employ also a number of draftsmen whose work comes more specifically under some item for which I have an appropriation—as, for instance, the manufacture of guns and gun carriages. I have a specific item for that. I try to charge to the manufacture of guns and gun carriages all the expenses connected with their manufacture. Part of the expense is the drafting expense, for making designs. These draftsmen are paid out of the appropriation for performing the work they are engaged on. Of course those things to a certain extent shade into each other. Therefore I never have any difficulty in accurately and exactly using up the amount that is appropriated here for these purposes.

Mr. SMITH. So that you are satisfied that there is practically no balance of this, although you have not got the figures?

General CROZIER. Yes.

Mr. KEIFER. Is that unallotted balance large or small? Do you know?

General CROZIER. It is undoubtedly small. I have not the figures here. I have to keep on hand enough to run me to the end of the year, because this is expected to be used up at the end of the year.

Mr. FITZGERALD. What proportion of this is used for draftsmen and what proportion goes to the officers?

General CROZIER. For the draftsmen about $12,000 is required, and for the expenses of officers at the proving ground about $6,000 is required.

Mr. FITZGERALD. Do these officers get their mileage?

General CROZIER. No, sir; that is not intended to cover mileage.

Mr. FITZGERALD. Do they get mileage in addition to this?

General CROZIER. If they have to travel they do.

PER DIEM ALLOWANCE OF $2.50.

Mr. FITZGERALD. What does this $2.50 a day cover, or what is it supposed to cover?

General CROZIER. I will explain it to you. At the proving ground the Government does not provide quarters for the officers and their families who are on duty there. There is a house where the officers who have this duty are lodged during the time that they are there. Their station is given in orders as New York City, and they receive commutation of quarters to provide themselves with quarters in New York City and its vicinity. Of course, we allow them to live in the suburbs. Some of these officers have Government quarters at Governors Island, which, you know, is just off the lower end of New York City. Those officers do not have commutation of quarters, of course. They have quarters furnished in kind. At the artillery post of Fort Hancock, which adjoins the proving ground at Sandy Hook, they have more quarters than they have officers for. By an arrangement with the commanding general of the Department of the East four of my Sandy Hook officers occupy four vacant houses at Fort Hancock, and those officers, naturally, receive no commutation of

quarters, although the terms of their orders assigning them to stations in New York City would permit it. Of course they ought not to have it, though technically the orders would permit them to have it. It is not paid to them because they have Government quarters.

Now, the other officers spend the week at Sandy Hook and live in this house there, which is maintained by the Government for the purpose. They never see any of this $2.50 per day which is allotted to them for expenses while they are there. It is paid into the hands of one of them who acts as disbursing officer, and this house is maintained out of the proceeds. They are boarded and lodged there during the week. That effects the object not only of providing these officers with their subsistence and lodging when they are away from their families and have to be maintained elsewhere, but it accomplishes another object.

Sandy Hook being the proving ground where a number of parties are having their inventions tested and their materials which they furnish to the Government tested, there are frequent visits of persons who have an interest in the work which is going on there—a business interest in it. There are also frequent official visits from Washington. Every once in a while the Board of Ordnance and Fortification goes down there to observe the experiments which are in progress. Once in a while, not nearly as frequently as I would like, a committee of Congress goes down there for the same purpose, and once in a while individual members of these committees go there to see how the business is conducted. There is no hotel there or any other such place where these persons can be taken care of if they stop over night, nor where they can have a meal. There is no provision otherwise where those facilities could be afforded. This house is there for that purpose, and it is maintained out of this $2.50 per day, which is paid to these officers. That is the object of that appropriation, and that is the manner in which it is expended.

Now, I will say another thing in regard to it. I hope that the method will not be changed, and I hope that the committee will not recommend the erection of quarters at Sandy Hook for the accommodation of these officers, for the reason that Sandy Hook is my principal educational establishment, particularly for the new officers that come into the corps. There we do a great deal of handling and of firing new guns and shells and explosives, and there is the place where the most is to be learned about the business of the Ordnance Department. You gentlemen are aware, of course, how large a part of the education of any person practicing a profession is composed of professional conversation. At that place at Sandy Hook these officers sit down, a dozen or more, at their meals every day, three times a day, and I venture to say it is very rarely that any other subject except ordnance is mentioned at any one of these meals. It is ordnance from morning till night, and it is very beneficial to these officers, and I would be very sorry to have the method changed. If another method of maintaining them and providing for them down there is established—that is, the usual method at army posts of separate quarters—that gathering which now takes place at the table every day would of course cease, as well as the resulting benefits from it. I think possibly that some of the officers would like the quarters moved [laughter], but I, as their chief, think it is better for them

and better for the Department that the establishment should be carried on as it is now.

Mr. KEIFER. Separate quarters and a separate mess?

General CROZIER. Yes.

Mr. SMITH. It costs only about $6,000 a year to run that boarding house there?

General CROZIER. Yes; and you are always welcome at it, Mr. Chairman. I only wish you would find it convenient to visit it more frequently.

Mr. SMITH. Thank you.

REPAIRS OF RAILROAD TRACKS, SANDY HOOK PROVING GROUND.

Mr. SMITH. The next item in the bill is for repairs of railroad tracks connecting the proving ground with the Central Railroad of New Jersey. How much railroad track do you have there, General?

General CROZIER. Six miles.

Mr. SMITH. Does it cost on an average a thousand dollars a mile to keep it in repair?

General CROZIER. I employ there nine men continually, whose pay aggregates $5,164.50. The remainder goes for material, ties, and spikes and rails.

Mr. SMITH. You say nine men?

General CROZIER. Yes. The road is six miles long. I am in hopes that that amount may be diminished, because last year you gave me a sum of money for straightening the railroad, and in straightening it I hope to improve it. I hope it will require less work and maintenance hereafter. The one expensive portion of it runs over a low beach uniting Sandy Hook with the mainland. There the sand washes a great deal. We are fighting it all the time in the effort to get it in such a state that the continual work of keeping it in order will not be so great.

Mr. FITZGERALD. Is that beach bulkheaded and breakwatered?

General CROZIER. It is not bulkheaded with timber construction. We have, however, recently dumped a great deal of rock on the seaward side of the railroad.

Mr. FITZGERALD. The Central Railroad all down that arm of the coast is bulkheaded with timber construction and stone. Would that method suit you?

General CROZIER. That method is more expensive, and I have never asked Congress to appropriate for it. I want to avoid it if I can. I have practically no unexpended balance on that. During the fiscal year ending June 30, 1905, there were 36,000,000 pounds of freight and 125,000 passengers transported.

Mr. GRAFF. These nine men are paid out of this appropriation?

General CROZIER. Yes; out of this $6,000. There are no houses at Sandy Hook, or very few at least, for these workmen that I have employed there. Some of the workmen have to live there, as, for instance, the locomotive engineer has to live there; but the clerks and workmen in general live at the end of this railroad, and I haul them back and forth. Every time one of them is hauled I call him a passenger.

Mr. SMITH. These people, the engineer and the clerks, are not paid out of this?

General CROZIER. No. They come out of this first item for Sandy Hook, $50,243, I think it is.

FRANKFORD ARSENAL, PHILADELPHIA, PA.

Mr. SMITH. The next item is for the Frankford Arsenal, Philadelphia, Pa.: "For machinery for shrapnel plant, $20,000." How long is it since you have had an appropriation for this, General?

General CROZIER. We had $30,000 for it last year, sir.

Mr. SMITH. Two years ago, was it not? The act approved April 21, 1904?

General CROZIER. Yes; two years ago.

Mr. SMITH. Has that been expended?

General CROZIER. Yes.

Mr. SMITH. So this is intended to buy additional machinery, or is it for the completion of the amount necessary to buy a given set of machines?

General CROZIER. It will increase the capacity of the shrapnel plant without putting in any new buildings. It enables us to turn out 400 shrapnel a day for the field guns and a small additional number for the siege guns. The object is simply to have a larger plant available in time of war and to utilize the space in the building which I have on hand for that purpose. Our plant for field-artillery ammunition is limited and the facilities for manufacturing it in the country are limited. It requires special machinery, which can not be produced at once as it is needed, and I think this additional reserve of plant should be provided, though I do not expect to operate it at its full capacity in time of peace.

Mr. SMITH. Your present equipment is abundant in time of peace?

General CROZIER. We can get along with the present equipment in time of peace; but, as I said to the committee yesterday, the only way possible to maintain a reserve plant in idleness is to have it in the possession of the Government. A plant in the possession of private manufacturers must be kept in operation or it will go out of business; the owners will go into something else.

Mr. KEIFER. It will go into something else?

General CROZIER. Yes.

Mr. KEIFER. Let me ask you, have you expended the $30,000 appropriated by the act of April 21, 1904, in buying machinery at this plant? Has that been expended?

General CROZIER. Yes, sir.

Mr. KEIFER. It says "necessary machinery." What you want is $20,000 more to be expended in addition to the $30,000 already expended?

General CROZIER. Yes. My estimate was $50,000. Congress gave me $30,000. It was not necessary to give it all at once. I expended the $30,000, and I now present it to you that the appropriation of the remaining $20,000 would be wise and would enable us to increase the capacity of that plant.

Mr. KEIFER. Do you use any shrapnel now?

General CROZIER. The principal projectile for field artillery is shrapnel. Seventy-five per cent of the projectiles with which we supply our field batteries is shrapnel.

Mr. KEIFER. Do they use it?

General CROZIER. Yes.

Mr. KEIFER. For what purpose?

General CROZIER. Its principal purpose is for use against troops, as distinguished from use against walls and fortifications and houses.

Mr. KEIFER. It is used in experimental work?

General CROZIER. Yes; and in target practice, to a certain extent. But we try to limit that, because shrapnel is expensive. They have to practice in trying to burst them at the right place.

Mr. KEIFER. Is it a time fuse?

General CROZIER. Yes; and the fuse that is used has a percussion element also, so that if the shrapnel should hit the ground before the time it arrives at the object aimed at it would explode by percussion.

Mr. KEIFER. It would explode on the ground?

General CROZIER. Yes; always. If it should strike the ground before the time element is burned out it would explode. It has to receive a retardation in the direction of its length in order that the percussion element should go off, and one of the things we lie awake nights about is to get a fuse to go off at the time for which it is set. They do not always do it. We hope, however, that the fuses of the Ordnance Department will.

Mr. KEIFER. The old ones did not go off half the time in actual practice.

General CROZIER. Yes; that has been the difficulty.

Mr. FITZGERALD. What is the present output of the shop with its present equipment?

General CROZIER. It is about 250 per day.

Mr. FITZGERALD. Two hundred and fifty field shrapnel?

General CROZIER. Yes.

Mr. FITZGERALD. How many of the others?

General CROZIER. I suppose about 25 siege shrapnel per day in addition.

Mr. KEIFER. In time of war it would be necessary to run all of this in order to keep up the ammunition supply?

General CROZIER. Yes; I think we would also run it day and night, and more than double the capacity.

WATERTOWN ARSENAL, WATERTOWN, MASS.—NEW MACHINES.

Mr. SMITH. The next item is "Watertown Arsenal, Watertown, Mass.: For new machines and the installation of same, $15,000." What character of machines does this refer to?

General CROZIER. Machines for general machine work. Watertown Arsenal is the Government establishment as which such seacoast gun carriages, large and small, as are manufactured by the Government for itself are built. Its capacity is not nearly sufficient to do all this work that the Government requires, and I am contemplating making it sufficient. I expect to continue to do a considerable majority of seacoast gun-carriage work at private establishments. That is possible, because any well-equipped machine shop can do the work. Therefore I do not desire to enlarge the Watertown Arsenal, but I do desire to maintain the efficiency of its present capacity. I

wish to have modern tools in it. I wish to keep the plant up. That is desirable on the score of economy, if for no other reason. It requires a certain expenditure every year to keep the plant modern. All machine-shop practice contemplates that.

Mr. BRUNDIDGE. What was given you last year for this purpose?

Mr. SMITH. Nothing in this bill.

General CROZIER. I asked for an appropriation, but Congress did not give it. The Watertown Arsenal has been allowed to run down more than any other of our establishments and is more in need of a special appropriation to take some steps toward modernizing the plant.

It is only a moderate sum that I ask for. If I allow it to run down I would have to cease doing work there, and I would lose the advantage of having a Government establishment where I could establish standards to ascertain what the work ought to cost elsewhere. A manufacturer can not tell what a particular kind of new work is going to cost in advance, and therefore he is naturally inclined to cover himself against all possible loss, and if I have to close down this shop I lose thereby one of the places where my officers continue to be expert in mechanical manufactures, so that they are capable of seeing to it that the Government gets what it pays for when it has work done outside. Therefore I hope you will allow this sum.

Mr. SMITH. How long has it been since you got an appropriation for machinery there, General? Do you know?

General CROZIER. Two years ago I had an appropriation of $30,000.

Mr. SMITH. Do you know whether any amount of that is still available?

General CROZIER. I think that has all been expended. The principal object for which it was expended was the improvement of the traveling cranes that run over the machines in the shops. I followed the practice of all people who have similar establishments and electrified these cranes.

FRANKFORD ARSENAL.

Mr. SMITH. Now, tell us what is done in a general way at each of the arsenals now. The Frankford Arsenal comes first in our list. What is that for?

General CROZIER. Shall I commence with the Frankford Arsenal or with the most northerly one?

Mr. SMITH. I only suggested Frankford first, because that would be in the order of the bill here.

General CROZIER. The principal work at the Frankford Arsenal is the manufacture of small-arms ammunition. We do not there manufacture all that the Government uses. I get a part of it by contract. You understand readily the reason for that. I want to have in existence private plants capable of turning out great quantities of materials that we need in time of war. In addition, there is manufactured at the Frankford Arsenal ammunition for small artillery, both field and seacoast; and there is also manufactured there a considerable number of instruments of precision, which are used in connection with the system of fire control and direction.

Mr. SMITH. That is all of the Frankford Arsenal?

WATERTOWN ARSENAL, WATERTOWN, MASS.

Watertown is now exclusively devoted to carriages?

General CROZIER. Not exclusively, but principally devoted to the manufacture of seacoast gun carriages. I also make there certain instruments used by the seacoast artillery—sponges, and rammers, and materials of that sort. But the burden of the work is seacoast gun carriages.

Mr. FITZGERALD. Will you state also the number of people employed at each of those places?

General CROZIER. Yes. At Frankford we employ 1,500. The number employed at Watertown is 350. There is considerable doing there, you see.

WATERVLIET ARSENAL, WATERVLIET, N. Y.

The next arsenal mentioned in the bill is Watervliet Arsenal, at Watervliet, N. Y., just above Albany. That is the Government gun factory, where the greater part of the cannon used in the service are manufactured. They are not manufactured exclusively at the Watervliet Arsenal. As you have just seen, a number of 12-inch, 10-inch, and 8-inch guns have been manufactured by the Bethlehem Steel Company, and in addition I have smaller guns manufactured by other private establishments. But many of them are manufactured at the Watervliet Arsenal, and we employ there about 300 or 350 men.

Mr. SMITH. That covers all the arsenals that are covered by this bill?

General CROZIER. Yes; but not all those that are likely to be mentioned in the next bill that we will present to you gentlemen. [Laughter.]

Mr. SMITH. Have you been doing work for the Navy at the Watervliet Arsenal?

General CROZIER. Yes, sir; I am building twenty-four 8-inch guns and twenty-four 7-inch guns, for the reason that because of the progress that has been made in the armament of seacoast fortifications I have not at present employment in army work exclusively for all the plant that is at that arsenal, and it has been deemed wise to use the plant for the use of the Navy.

Mr. FITZGERALD. Do you build more cheaply than they could build by private enterprise?

General CROZIER. I think so.

Mr. FITZGERALD. Has that ever been gone into sufficiently to determine that?

General CROZIER. We have not yet made any comparison, Mr. Fitzgerald, which would enable me to give you the figures; and perhaps that should need a little explanation. I will not claim now, whatever my private idea on the subject may be, that we manufacture at our establishments more cheaply than private manufacturers do, when we count in everything that the private manufacturer has to count in with his expenses—that is, when we count in interest on investments; when we count in losses by fire, as against his insurance; when we count in deterioration, and when we count in all those elements which are not a charge against the special appropriation which

does the work—I will not claim now that our net result is a cheaper manufacture than that of a private individual. But with reference to this particular work that we are speaking of, I would invite your attention to the fact that whether we employ this machinery or not, the interest on the investment runs on just the same; so, also, the deterioration and the possibility of fire. So also the pay of officers who are at this arsenal. Consequently, by doing this work at the Watervliet Arsenal in this way, the Government has to spend an amount out of the appropriations made for the Navy which is less than it would be called upon to expend if it had the work done by a private manufacturer.

Mr. FITZGERALD. How many men do you employ up there?

General CROZIER. From 300 to 350 men. It is not one of the largest of the arsenals. It is a considerable establishment, however.

Mr. SMITH. I understand that while this submarine matter is under you in the report, it is not under your immediate jurisdiction?

General CROZIER. It is not. I only audit the accounts.

SATURDAY, *January 27, 1906.*

ARSENALS AND ARMORIES.

STATEMENT OF CAPT. CHARLES B. WHEELER, ASSISTANT TO THE CHIEF OF ORDNANCE, U. S. ARMY.

Mr. SMITH. We are receiving, Captain Wheeler, from General Crozier a list of arsenals and the class of work done at each of them. How many arsenals are there besides those named by him—Frankford, Watertown, and Watervliet?

SPRINGFIELD ARMORY, SPRINGFIELD, MASS.

Captain WHEELER. We have an armory at Springfield, Mass., where the small arm is manufactured, including the bayonets, and swords, and sabers for the Army.

ROCK ISLAND ARSENAL, ROCK ISLAND, ILL.

We have also a large arsenal at Rock Island, Ill., where the principal manufacture is carriages for mobile artillery—field carriages and siege carriages—and all personal and horse equipments. There is also established here an armory for the manufacture of small arms similar to the plant at the Springfield Armory.

AUGUSTA ARSENAL, AUGUSTA, GA.

In addition to these larger arsenals we have an arsenal at Augusta, Ga., which is the headquarters of an armament district, and is used principally for the storage and supply of material to a certain district of the seacoast.

SAN ANTONIO ARSENAL, SAN ANTONIO, TEX.

We have at San Antonio, Tex., another arsenal, where there is but one officer stationed. That is also a place of storage and supply, and it is also the headquarters of an armament district for the care and preservation of the mobile artillery within certain geographical lines.

BENICIA ARSENAL, BENICIA, CAL.

On the Pacific coast we have at Benicia, Cal., another arsenal, which is a large supply depot for the western coast and also for the Philippine Islands. It is also the headquarters of a ceacoast armament district, and considerable work in preservation and repair is carried on there.

ARSENAL AT GOVERNORS ISLAND, NEW YORK.

At New York we have an arsenal on Governors Island, which is a place of storage and supply; there is no manufacturing work at that arsenal.

Mr. SMITH. Is that all?

MANILA ORDNANCE DEPOT, MANILA, P. I.

Captain WHEELER. In the insular possessions we have at Manila an ordnance depot which is a place of supply for the Philippine Islands, and also a place where we make repairs and manufacture a certain limited amount of small articles that may be required.

Mr. KEIFER. Is ammunition manufactured there?

Captain WHEELER. No, sir; no ammunition is manufactured there.

POWDER DEPOT, DOVER, N. J.

Then, we have another establishment at Dover, N. J., which is the United States powder depot, where we store all the powder which is held in reserve and is not kept in storage within various fortifications. It is not a manufacturing establishment, although we are now equipping a machine shop so that we will be prepared to make any alterations in projectiles and fuses that may be necessary from time to time.

Mr. KEIFER. You mean to make alterations at Dover?

Captain WHEELER. Yes, sir.

Mr. SMITH. What is the difference between an ordnance storage warehouse and an arsenal where you do not manufacture ordnance?

Captain WHEELER. I believe that the term, as we use it, depends upon its designation in the law that established the place. Springfield, while it is an arsenal, is called an armory, because, I think, that was the designation in the law.

Mr. SMITH. The one at Manila, you say, is called an ordnance storage warehouse?

Captain WHEELER. No; that is called the Manila Ordnance Depot.

Mr. SMITH. But it is not different in any respect, as I understand you, from any other arsenal, except you do not manufacture there except in a small way.

Captain WHEELER. It is similar to all the other establishments.

WATERTOWN ARSENAL, WATERTOWN, MASS.—PATTERN STOREHOUSE.

Mr. SMITH. The next item is "For modifying parts of pattern storehouse for use as pattern shop, including purchase and installation of necessary machines, workbenches, and heating apparatus, $5,500."

Mr. BRUNDIDGE. Where is that?

Mr. SMITH. At the bottom of page 15. As a matter of fact, is the pattern storehouse there larger than is reasonably necessary for that purpose?

Captain WHEELER. There is storage room at Watertown which, by making certain changes in the place of deposit of patterns on hand, would be sufficiently large to provide the space which is now required for this enlargement of the pattern shop. The pattern shop and the carpenter shop at Watertown Arsenal are situated in a building which was only large enough in the beginning for the carpenter shop, but as the manufacture of Watertown increased it became necessary to utilize machines which were already in the carpenter shop, so that the location of the machines really established the place for the pattern shop. In the last year or two we have established a steel-casting plant at the Watertown Arsenal requiring the manufacture of a large number of patterns which we originally had made at different private establishments in the country. This is a small steel-casting plant, and is only intended to provide those small castings which the private manufacturer could not be induced to produce at a reasonable price. In order to provide the patterns under proper supervision it is desirable to floor a part of the storehouse so as to move some of the pattern makers and put them into that place.

Mr. SMITH. How does it come that the pattern storehouse was constructed so large in time of peace that it can be taken now for another purpose?

Captain WHEELER. The Watertown Arsenal was established, I think, about the year 1832, and the buildings that are now at the arsenal, including the storehouses, were constructed to meet conditions then existing; but at present there is a little storage room at the Watertown Arsenal that is not utilized.

Mr. SMITH. Were they constructed larger than was necessary at the time?

Captain WHEELER. I think not, and that during the civil war the facilities of the arsenal were possibly not too large. But at the present time there is storage room that is available for the pattern shop.

Mr. KEIFER. When that was built were there not very few such storage places?

Captain WHEELER. Yes.

Mr. KEIFER. Others have been built since in different parts of the country?

Captain WHEELER. Yes, sir.

WATERVLIET ARSENAL, WATERVLIET, N. Y.—ALTERATION OF CRANES.

Mr. SMITH. Now, passing to the next item, last year, as I understand it, we gave you $14,000 for the alteration of cranes at the seacoast gun factory, Watervliet Arsenal?

Captain WHEELER. Yes, sir.

Mr. SMITH. I notice this year you report that these cranes are worn out. You say: "They have been worn out by constant use and are now of obsolete pattern. The cost of maintaining and repairing them is extravagant, and their use, as at present fitted, is attended with danger to life and material."

Captain WHEELER. I think that item on page 16, at the top, refers to last year's estimates.

Mr. SMITH. It does; but the question I am asking you is, how did we come to give you $14,000 to fix up cranes which, before the money is expended, are reported to be so worn-out and of such obsolete pattern that the cost of repairing them would be extravagant?

Captain WHEELER. We are not estimating for any improvements on those this year.

Mr. SMITH. I know; but you would not want us to give you $14,000 last year for repairs of material so obsolete that it would be thrown away the next year, would you?

Captain WHEELER. I do not understand your question, Mr. Chairman.

Mr. SMITH. Have you spent this $14,000?

Captain WHEELER. Yes, sir; it has been spent.

Mr. SMITH. Now, what was this $14,000 for? Was it used for electrifying the cranes?

Captain WHEELER. The $14,000 was intended to rebuild or remodel some old cranes which had been at the gun factory for a long time, so that they were practically worn out.

Mr. SMITH. I do not see why we came to appropriate for you $14,000 for alteration of machinery which you said in your own report was in such condition that the cost of repairing and maintaining was extravagant.

Mr. KEIFER. That was the cost of maintaining and repairing as formerly done.

ELECTRIFYING HEAVY MACHINES, WATERVLIET ARSENAL.

Captain WHEELER. The cranes to which this item refers were in constant use for fifteen years or more. The repairs to these cranes, as they then existed, were very costly. We asked for $14,000 in order to rebuild the trolleys and equip them electrically so that we would not lose so much energy in the transmission of power by the square shaft drive.

Mr. SMITH. This electrifying of heavy machines includes cranes asked for in the next item, does it not?

Captain WHEELER. It is not intended to include cranes. We have finished the improvement of the cranes—they are practically new—and we now desire to attach electric motors to several of the large machines in the south wing of the gun shop. Heretofore these machines have been driven by a line of shafting and belting, and if the machines were not working we would still have to drive the main shafting and counter-shafting. That was a great loss of power, and not economical, and we have determined by trial in the north wing that we make a very large saving by attaching motors to these large machines and driving them by electric power. The losses are immaterial. The efficiency of the motor drive is high,

and we do not have to run the motors unless the machinery is in operation.

Mr. FITZGERALD. These are arranged along there in a row in that long building?

Captain WHEELER. Yes.

Mr. FITZGERALD. What is the motive power now?

Captain WHEELER. We have both electrical power and belt-transmission power. Some of the machines have been equipped electrically, and the item of $20,000 included in these estimates is asked for the purpose of electrically equipping a number of additional lathes and machines.

Mr. FITZGERALD. Will that complete all these lathes in there? Those are the ones you bore the guns with, are they?

Captain WHEELER. Yes. This will complete the application of electric power to the gun shop.

Mr. SMITH. How much did we give you for the north wing? Do you remember?

Captain WHEELER. I do not happen to have that information with me.

Mr. SMITH. What is the relative expense of the north wing and the south wing for electrifying?

Captain WHEELER. I can not state without determining the number of machines for which motors will be required. I have not that information at hand, but I can furnish it to the committee later on.

Mr. FITZGERALD. What percentage of saving would you make by electrifying these heavy machines over what it costs to operate them in their present condition?

Captain WHEELER. I think that the saving would probably amount to at least 25 per cent of the original power required. That is to say, I think the loss in the shafting and countershafting and belting would possibly amount to 28 or 30 per cent.

Mr. FITZGERALD. Could you express that in dollars?

Captain WHEELER. I could not express it in dollars just at present, but I could furnish it to the committee later.

Mr. FITZGERALD. If we could tell how much is saved on that it might be material.

Captain WHEELER. We have the information in the Ordnance Office.

FORTIFICATIONS IN INSULAR POSSESSIONS—PURCHASE, MANUFACTURE, AND TEST OF SEACOAST CANNON.

Mr. SMITH. If there is no other further inquiry on that item, the next item under the Ordnance seems to be, on page 18, "For the purchase, manufacture, and test of seacoast cannon for coast defense for the insular possessions." You use the words "and test," substituted throughout the bill for "test and issue."

Captain WHEELER. Yes, sir.

Mr. SMITH. I notice in the old law part of this read "and test" and part of it "test and issue."

Captain WHEELER. Yes.

Mr. FITZGERALD. What is the difference in that?

Mr. SMITH. The only difference is, apparently, that it would cover the expense of issue more specifically in the same item if the words were left in.

Mr. KEIFER. It does not look to me as if there was much difference.

Mr. FITZGERALD. Are there any expenses in the issuing as distinguished from the testing?

Captain WHEELER. As explained by General Crozier yesterday, the word "issue" would apply to those expenses involved in the movement of the article from the place of its manufacture to the place where it will be located in the service, and in a way it conflicts with the appropriation for the Quartermaster-General for the same purpose.

Mr. SMITH. "Issue" and "transportation" are largely the same in that sense?

Captain WHEELER. They are largely the same; yes.

Mr. SMITH. Now, this is for the purchase, manufacture, and test of seacoast cannon. To what extent have the emplacements been provided for these cannon?

Captain WHEELER. The emplacements are under construction in the insular possessions for the guns and carriages, for which money was appropriated at the last session of Congress.

Mr. SMITH. The estimate of $923,000 for this year would be dependent, would it not, on the amount to be allowed you for emplacements?

Captain WHEELER. Yes, sir. That estimate is made so as to be coordinated with the estimate of the Chief of Engineers, and if the money is not allotted for the emplacements for which these guns and carriages are estimated there would be no necessity for the guns and carriages.

Mr. SMITH. How ought the appropriations for the emplacements of guns to be made? That is, which is the longer, ordinarily, in getting ready, the emplacement or the gun?

Captain WHEELER. Ordinarily it takes longer to produce the guns than the emplacements.

Mr. SMITH. So that the guns should be provided at least as early, if not earlier, than the emplacement?

Captain WHEELER. That has been the general rule which we have been following.

Mr. SMITH. So that if we reduce the emplacements' estimate we should reduce this; and it would be still truer that if we reduced this we should reduce the emplacements?

Captain WHEELER. I should say so.

Mr. SMITH. What is the unexpended balance of this item. Is there a Treasury balance? What is your unallotted balance also?

Captain WHEELER. The unexpended Treasury balance on January 1, 1906, was $443,901.81. The unallotted balance on the same date was $61,703.40.

Mr. BRUNDIDGE. What was the first item?

Captain WHEELER. $443,901.81.

Mr. GRAFF. And the second one?

Captain WHEELER. $61,703.40.

Mr. SMITH. You had obtained money for this purpose from some source other than the appropriation for it? I noticed that our notes here only show direct appropriations for this purpose for two years. Have there been appropriations made for more than two years for this identical purpose, or did you get an allotment of this $443,901.81 from some other source?

Captain WHEELER. I think this explanation will probably account for the difference: In the act of April 21, 1904, we had an appropriation, but it was under a different heading. So far as I know, we have had no allotment for the manufacture of armament of fortifications beyond the sums appropriated by Congress.

Mr. SMITH. Do you remember what the terms of that appropriation were under which you say you got this money prior to two years ago?

Captain WHEELER. In the act of April 21, 1904, $162,000 was appropriated for the purchase, manufacture, test, and issue of rapid-fire guns for coast defense for the insular possessions, including the carriages, sights, implements, equipments, and the machinery necessary for their manufacture at the arsenals.

Mr. SMITH. That was rapid-fire guns?

Captain WHEELER. That was for rapid-fire guns at that time.

Mr. SMITH. And this is for seacoast cannon?

Captain WHEELER. Since that time the heading of the appropriation has been changed so as to include both rapid-fire guns and guns of larger caliber, whereas before that the appropriations were made separately for the two kinds of guns.

Mr. SMITH. That is, you say that the language, "purchase, manufacture, and test of seacoast cannon," includes all others?

Captain WHEELER. Yes. It was changed at the last session. It used to read "seacoast guns." But as it now reads "seacoast cannon," it would comprise rapid-fire guns, large guns, and mortars.

Mr. SMITH. In the term "rapid-fire guns" do you include all forms of rapid-fire guns, or only such forms as are used in seacoast defense?

Captain WHEELER. Only seacoast guns.

Mr. KEIFER. Not like those used on land anywhere?

Captain WHEELER. Only those that are used on the seacoast.

Mr. SMITH. I realize that it certainly could not apply to anything except seacoast defense in this item, but I do not know whether you could use any small-caliber rapid-fire guns in the batteries. We understood here it was a common practice to have small-caliber rapid-fire guns along with mobile artillery in connection with these seacoast fortifications. Of course, the small-caliber rapid-fire gun is not a gun, as I take it?

Captain WHEELER. No; it is not a cannon.

Mr. SMITH. Even though it was used in connection with seacoast fortifications?

Captain WHEELER. It would not be called a cannon.

Mr. SMITH. Your Treasury balance exceeds all the last two years' appropriations?

Captain WHEELER. The Treasury balance that I gave you included the balances from the appropriation made in the act of April 21, 1904, for rapid-fire guns, for seacoast guns, and for seacoast mortars.

Mr. SMITH. But I notice that the Treasury balance exceeds the appropriations we have given you the last few years.

Captain WHEELER. Possibly I should not have included them. Congress last year having included the rapid-fire guns and seacoast guns and mortars in one heading, the balance I have just given you was made up to include the balance we have on our books under the different appropriation headings of former years.

Mr. FITZGERALD. You have already been authorized to mount four 12-inch rifles and five 10-inch rifles in the insular possessions, as appears from that language, which has not been included in this bill. Are they guns that were manufactured for the defense of the United States, but which are designated as surplus guns?

Captain WHEELER. Two 12-inch guns and three 10-inch guns, I think.

Mr. FITZGERALD. In addition thereto, two 12-inch and two 10-inch. That makes four and five?

Captain WHEELER. Yes, sir.

Mr. FITZGERALD. Now, you ask, in addition to that, to be authorized to mount two more 10-inch and nine 12-inch rifles out of those surplus funds, making in all thirteen 12-inch and seven 10-inch guns. Is that correct?

Mr. KEIFER. You will notice the reading at the bottom of page 18 of the bill: "That the Secretary of War is authorized to mount two 10-inch and nine 12-inch rifles on a corresponding number of carriages, for which estimates are herewith," etc.

Captain WHEELER. I think those figures are in error.

Mr. FITZGERALD. Which particular figures?

Captain WHEELER. The figures in our estimates this year are in error. We asked last year to have two 12-inch and two 10-inch rifles, which were surplus and on hand, authorized for use on a corresponding number of carriages, but the money was not appropriated for the carriages, so that we have failed to mount these two 10-inch and two 12-inch guns. No carriages for them were provided, and the estimate for carriages is now included in this year's estimates, so that the number of guns——

Mr. FITZGERALD. You do not get what I am after. What I want to know is: How many 12-inch and how many 10-inch guns have been transferred from the surplus supply for the United States for use in the insular possessions? And taking these figures I made it four 12-inch and five 10-inch. Is that accurate?

Captain WHEELER. Yes; that is correct.

Mr. FITZGERALD. Then you ask in addition that there be transferred two 10-inch and nine 12-inch rifles.

Captain WHEELER. Yes; we should have asked for only seven 12-inch guns this year.

Mr. FITZGERALD. You should have asked for only seven?

Captain WHEELER. Yes, sir.

Mr. SMITH. Do you want that corrected in the bill? Do you ask for seven 12-inch?

Captain WHEELER. You see, Mr. Chairman, we asked in the last year to be authorized to mount two 12-inch and two 10-inch rifles on carriages, for which estimates were submitted; but the appropriation for the carriages was not made.

Mr. SMITH. But the authorization to mount the guns was given, was it not?

Captain WHEELER. The authorization was given; yes, sir.

Mr. SMITH. So that you have already been authorized to mount nine of these guns from our surplus stock in the insular possessions?

Captain WHEELER. Yes, sir; nine.

Mr. FITZGERALD. Now, you ask here for two additional 10-inch guns, and you say it should be seven instead of nine 12-inch?

Captain WHEELER. Yes, sir.

Mr. KEIFER. That does not correspond with the note at the top of page 19. I simply call your attention to it.

Mr. FITZGERALD. They asked first for an appropriation. We are not referring to that; we are referring to the authorization to make these transfers.

Mr. KEIFER. This note does refer to the number, two 10-inch gun carriages complete, and so on, running down; nine 12-inch gun carriages, and so forth.

Captain WHEELER. We only ask this year for seven 12-inch guns and no 10-inch.

Mr. FITZGERALD. That should be out this year?

Captain WHEELER. Yes; no 10-inch.

Mr. SMITH. The object of this first is to cover the carriages. Is there not confusion of language, then, Captain, when you strike out the language of the bill as now drawn?

Captain WHEELER. There would be confusion, because we are estimating for more carriages than we are asking for guns to mount upon them.

Mr. SMITH. Had not that language better be revised?

Captain WHEELER. I think it should.

Mr. SMITH. It appears that last year you were authorized to mount four 12-inch and five 10-inch rifles. Those guns were surplus guns and not mounted in the United States. That authority has already been given. This year in this bill there is proposed to mount two 10-inch and nine 12-inch guns out of that surplus. In the first place, according to the memorandum I made, there was only one 10-inch gun unmounted on hand in the War Department, so that that could not be new.

Captain WHEELER. None of these guns are mounted.

Mr. SMITH. Last year we did not give them anything to mount them with.

Captain WHEELER. We submitted estimates last year, expecting to have appropriations for the carriages upon which to mount them, but no appropriation was made for the carriages.

Mr. FITZGERALD. If this language were continued, then the total transfer from the surplus guns of the United States to the insular possessions would be thirteen 12-inch guns and seven 10-inch guns?

Captain WHEELER. This is true: We only desire to have a total transfer of five 10-inch guns and eleven 12-inch guns.

Mr. SMITH. I suggest, Captain, that you furnish us a revision of the text of this bill which will convey your true meaning, if you will.

Captain WHEELER. Yes.

Mr. FITZGERALD. Where were these guns to be mounted? At what particular places, or generally?

Captain WHEELER. It is proposed to mount at Manila two 10-inch guns and eight 12-inch guns; at Subig Bay, three 10-inch guns and two 12-inch guns; at Honolulu, one 12-inch gun—making a total of five 10-inch and eleven 12-inch guns.

Mr. FITZGERALD. Was there any provision made for Guantanamo?

Captain WHEELER. There was, but not for 10-inch and 12-inch guns.

Mr. FITZGERALD. I mean out of this.

Captain WHEELER. No, sir; not for the 10 and 12 inch guns.

Mr. FITZGERALD. Have you any information as to the number of different guns required at these different points, if the plans already passed on were approved and we were to carry them out?

Captain WHEELER. The revision of a project for fortification is now in the hands of a board, of which the Secretary of War is president, and they have not yet submitted their report. Their report will probably be submitted within a short time. We are informed that the estimate which we have submitted will be included in the amounts to be asked for by that board.

Mr. FITZGERALD. Now, does this language contemplate, in addition to the guns you have asked to be transferred from the surplus guns in the manufacture of additional 10 and 12 inch surplus guns, the manufacture of additional 10 and 12 inch rifles for these possessions?

Captain WHEELER. No additional 10 and 12 inch guns for these possessions while we have surplus guns on hand.

Mr. FITZGERALD. Then why do you ask for an appropriation "For the purchase, manufacture, and test of seacoast cannon for coast defense for our insular possessions?"

Captain WHEELER. Because we have included in our estimate items for 15-pounders, 6-inch guns, and 12-inch mortars, which come under that heading.

Mr. FITZGERALD. Where was it intended that those particular guns should be mounted?

Captain WHEELER. The present plans contemplate mounting at Manila six 15-pounders, three 6-inch rifles, two 10-inch rifles, eight 12-inch rifles, and four 12-inch mortars; at Subig Bay, two 15-pounders and two 12-inch rifles; at Guantanamo, four 15-pounders and four 6-inch rifles; at Honolulu, one 12-inch rifle and eight 12-inch mortars. We have asked for money this year for nine 15-pounder guns and carriages, three 6-inch rifles and carriages, two 10-inch carriages, nine 12-inch carriages, and eight 12-inch mortars and carriages, in order to complete the plans that I have just mentioned.

Mr. SMITH. Should we conclude to reduce this appropriation asked for, and also that for emplacements, would the fact that a number of guns are being transferred from the United States to the insular possessions, that were to be mounted with this money, result in the reduction being greater on this item relatively than on the emplacements?

Captain WHEELER. I think the result would be greater on the emplacements.

Mr. SMITH. The reduction should be greater on the emplacements?

Captain WHEELER. I think so.

Mr. SMITH. Are the guns largely provided with emplacements in the United States? If we should decide to reduce both this request and the one for emplacements, and we wanted to balance them properly, should they be reduced at about the same percentage or should a greater reduction be made here than in the emplacements requested, because, in fact, the guns are already partly provided with emplacements?

Captain WHEELER. I should think that if you concluded to reduce the number of emplacements, the number of carriages should be reduced accordingly.

Mr. FITZGERALD. Suppose the committee should determine to give what was needed in this item, say, for instance, for Manila, and did not desire to give what you wanted in this item for the other points; the only way we could restrict the Bureau of Ordnance in using the appropriations for the particular point would be to provide specifically that it should only be expended for use at that point?

Captain WHEELER. Yes.

Mr. FITZGERALD. If we did not furnish any money for emplacements, you would not spend any money there?

Captain WHEELER. No.

Mr. FITZGERALD. That is what I was getting at, without saying just what the committee would do. [Laughter.]

Captain WHEELER. In this connection it must be noticed that we need one 15-pounder, three 6-inch, two 10-inch, and two 12-inch guns and carriages for emplacements which the engineers have already been authorized to construct.

Mr. SMITH. Can you give us an estimate of what this would cost for which emplacements have already been authorized?

Captain WHEELER. Yes.

Mr. FITZGERALD. Is this for carriages, or carriages and guns?

Captain WHEELER. Partly for both. The 15-pounder gun and mount would cost $6,500.

Mr. SMITH. Now, Captain, it is putting you to some labor, but could you tell us the aggregate of what would be all we would need—the aggregate amount necessary for the equipment for guns in the emplacements already authorized?

Captain WHEELER. It would require $292,500.

Mr. SMITH. For emplacements already authorized?

Captain WHEELER. Yes.

Mr. FITZGERALD. In this particular item?

Captain WHEELER. Yes, sir.

FORTIFICATIONS IN INSULAR POSSESSIONS—PURCHASE, MANUFACTURE, AND TEST OF AMMUNITION FOR SEACOAST CANNON.

Mr. SMITH. "For purchase, manufacture, and test of ammunition for seacoast cannon for the insular possessions, including the necessary experiments in connection herewith, and the machinery necessary for its manufacture at the arsenals," $276,360 is estimated. Now, what is the object, Captain, of the substitution of the word "herewith" for "therewith?" Do you think that is better English?

Captain WHEELER. It seems to me the word "therewith" should be retained.

Mr. KEIFER. I was wondering about that a while ago myself, and I thought the same thing.

Captain WHEELER. It is to be noted in this connection the word "therewith" is used in the corresponding item on page 9.

Mr. SMITH. Who proposed this substitution?

Captain WHEELER. I do not know, Mr. Chairman.

Mr. COURTS. It appears in the Book of Estimates literally that way, "herewith" instead of "therewith."

Mr. FITZGERALD. Perhaps it was done inadvertently.

Mr. KEIFER. Including the necessary experiments in connection with the purchase, manufacture, and test of ammunition?

Mr. FITZGERALD. It might be intended to include that latter part, to have experiments in connection with that machinery as well.

Mr. SMITH. Then it ought to be transposed entirely, if it was intended to cover the machinery.

Mr. FITZGERALD. You do not experiment with the machinery, do you, Captain?

Captain WHEELER. No, sir.

Mr. KEIFER. That means in connection with the seacoast cannon?

Mr. SMITH. That is in connection with the ammunition.

Mr. KEIFER. Let us see what he will say.

Captain WHEELER. It refers entirely to ammunition.

Mr. SMITH. What is the unexpended Treasury balance under this item?

Captain WHEELER. The Treasury balance on January 1, 1906, was $95,300, and the unallotted balance on the same date was $44,049.

Mr. SMITH. This is for reserve ammunition and not for practice ammunition?

Captain WHEELER. This is entirely for reserve ammunition.

Mr. SMITH. Is any item in this bill for practice ammunition in the insular possessions?

Captain WHEELER. No item.

Mr. SMITH. Is it not necessary to get reserve ammunition before you get the guns up and have practice ammunition?

Captain WHEELER. By the time the emplacements are finished and the guns and carriages are erected we should have some reserve ammunition, and the estimate contemplates the completion of the procurement of reserve ammunition for these guns.

Mr. SMITH. How many guns will you have mounted at the end of the year from this? Suppose you were not to get any more money at all except to mount the guns on emplacements already authorized?

Captain WHEELER. We would have three 15-pounders, ten 6-inch, two 10-inch, and three 12-inch guns mounted.

Mr. SMITH. What would be a reserve for two hours, as indicated by General Crozier, for these guns, and what would it cost?

Captain WHEELER. The total amount required on that basis would be approximately 270 rounds for the 15-pounders, 250 rounds for the 6-inch guns, 100 rounds for the 10-inch guns, 90 rounds for the 12-inch guns, and about 90 rounds for the 12-inch mortars.

Mr. SMITH. Could you give us an idea of what that would cost for those which you say would be mounted within the year?

Captain WHEELER. I can give you an estimate. Perhaps you would rather have me furnish it. It will take a little time to calculate it.

Mr. SMITH. Yes; make a note of that and tell us later on about what it will cost.

Captain WHEELER. You mean in addition to the amount we already have on hand?

Mr. SMITH. Yes, sir. You have some ammunition on hand and some money on hand, both?

Captain WHEELER. Yes.

Mr. FITZGERALD. Is it the opinion of the Department that you will

be able to use ammunition already manufactured in the insular possessions?

Captain WHEELER. We think we would require a special appropriation for ammunition for the insular possessions, as we do for the rest of the armament.

Mr. SMITH. It makes no difference whether it is provided separately or not; it would have to be used separately.

Mr. FITZGERALD. You have half of what was appropriated last year unalloted now—practically 44 per cent, or $44,029?

Captain WHEELER. Yes; very nearly half, which we are arranging to spend in the next six months.

Mr. FITZGERALD. That will be expended?

Captain WHEELER. Yes, sir.

FORTIFICATIONS IN INSULAR POSSESSIONS—PURCHASE, MANUFACTURE, AND TEST OF INSPECTING INSTRUMENTS, RANGE FINDERS, ETC.

Mr. SMITH. The next item is "For purchase, manufacture, and test of inspecting instruments, for the manufacture of cannons, carriages, and ammunition; range finders and other instruments for fire control at the fortifications in the insular possessions, and the machinery necessary for their manufacture at the arsenals." You got $16,000 for this item last year. That was the first appropriation for that purpose?

Captain WHEELER. Yes.

Mr. SMITH. What was your unexpended Treasury balance and your unexpended available balance?

Captain WHEELER. The Treasury balance on January 1, 1906, was $16,000. The unallotted balance on the same date was $16,000.

Mr. KEIFER. Why was none of it expended or allotted?

Captain WHEELER. The item was such a small one that it was thought to be more desirable and advantageous to withhold the order for this material until a larger order could be given.

Mr. SMITH. Is it a fact, Captain, that it is not time to buy range finders for guns when none of them have been mounted?

Captain WHEELER. It would probably take as long to get these range finders as it would take to construct a carriage. The instruments required for the fire control are special instruments, and it requires a considerable time to deliver them after the order is given, so that it has been the policy of the Department to submit estimates in time to complete the ordnance work at fortifications as nearly as possible, at the same time taking into consideration the probable rate of delivery of the different kinds of material called for.

Mr. SMITH. But you have not an appropriation for these carriages yet, have you?

Captain WHEELER. We have an appropriation for some of the carriages.

Mr. SMITH. Very few.

Captain WHEELER. You have already provided for 6 6-inch carriages, 3 10-inch carriages, and 2 12-inch carriages, and 4 12-inch mortar carriages by the act of April 21, 1904. By the act of March 3, 1905, we were supplied with funds for 3 15-pounders and 4 6-inch guns in addition.

Mr. SMITH. Is it not a fact that the reason why you have not expended any of this money for range finders and observation telescopes is that the matter had not progressed far enough prior to this time to require the range finders and telescopes?

Captain WHEELER. They are required in large quantities for our fortifications in this country, and are being supplied in large quantities.

Mr. SMITH. You misunderstood my question. I asked if one of the reasons why you did not expend this $16,000 was not that there was no call for telescopes and range finders yet in the insular possessions because we have no guns mounted there?

Captain WHEELER. The reason, I think, why we have not expended the money under that item is that we have been waiting to combine it with other sums for the same purpose, in order to make a reasonable order for their manufacture.

Mr. SMITH. If you were ordering large quantities of these for use in the United States, there would not be any difficulty in ordering a small number for the insular possessions at the same time? They are identical, are they not?

Captain WHEELER. Yes; they are identical. We would have so procured them if we had been able to give an order since the date of this appropriation for similar instruments for the United States.

Mr. FITZGERALD. Is not that fund already provided for in the other items? Are not inspecting instruments already provided for?

Captain WHEELER. We require in the manufacture of guns and carriages instruments of precision, which are provided for under that heading, such as star gauges and templates, to make parts interchangeable, etc. These have never been included in the direct cost.

Mr. FITZGERALD. Are not the different arsenals already supplied with these instruments?

Captain WHEELER. It depends upon what the material is; we require a new set of instruments if we assign the manufacture of a lot of carriages to a new manufacturer, provided that those sets on hand are not in excess.

Mr. FITZGERALD. But is there any particular reason why in the manufacture and purchase of these instruments for use in the insular possessions these testing instruments should be specially provided for? Would they not be manufactured in Government establishments or private establishments where provision has already been made for testing?

Captain WHEELER. We would not use any money for inspecting instruments if we had any on hand in the United States.

Mr. FITZGERALD. Is it contemplated that any money should be used for the object stated in that first clause out of this proposed appropriation—for inspecting instruments?

Captain WHEELER. We are making a new design of mortar carriage, and if we should give an order for the manufacture of these mortar carriages to a private establishment where inspecting instruments were required we would pay for those inspecting instruments out of this appropriation.

Mr. FITZGERALD. Would it not be very likely that a contract would be given not only for carriages for use in the insular possessions, but also for use in the coast defense of the United States?

Captain WHEELER. This last year we had to provide for 12-inch mortar carriages for the insular possessions. No mortar carriages were required for the United States. Those mortar carriages were made in accordance with drawings which had been prepared and under which a number of carriages had been made, so that special inspecting instruments were not required for them. But if they had been made in accordance with a new design the manufacturers would have required inspecting instruments, the payment of which would have been made under this appropriation.

Mr. FITZGERALD. What I want to ascertain is, whether it would not be sufficient to say simply, "For range finders and other instruments of fire control for use in the insular possessions?"

Captain WHEELER. That would prevent the Department from paying for the instruments required in the inspection service at private establishments entirely. The inspecting instruments are not range finders or other instruments for fire control. They are grouped in this appropriation, and this has been customary for some years, because they are all instruments of precision, and they are generally manufactured at the Frankford Arsenal.

Mr. FITZGERALD. And you also have in here "machinery necessary for manufacture." Is not the machinery already there? Would it not more likely be provided for the manufacture of carriages and ammunition required in this country in much larger quantities than in the insular possessions?

Captain WHEELER. The machinery sometimes is in the arsenal and sometimes not. In buying these instruments of precision we have generally given the contracts to private manufacturers. Sometimes it is desirable, for reasons of economy and other reasons, to make a part of these instruments at an arsenal. In case that is decided upon the arsenal would very likely require a few special machines, and the wording of this appropriation is intended to cover and permit the purchase of such special machines as might be required. We have an instance of that at the present time. We have been supplying a very fine optical instrument, in the way of a sight for field guns, which we have purchased from private manufacturers. We are now, for certain reasons, endeavoring to manufacture a few of them at the Frankford Arsenal, and it will be necessary to buy some machines in order to make some of the optical parts required.

Mr. FITZGERALD. How much of this amount for 1907, in addition to what you already have on hand, would be necessary to provide you with range finders and these other implements for the guns already mounted in the insular possessions?

Mr. SMITH. You mean or to be mounted in the next year?

Mr. FITZGERALD. Yes; for which provision is made already, or will be made?

Captain WHEELER. I should like to furnish that to the committee. The estimates that we have submitted here contemplate that all of the guns that have been provided, as well as those for which estimates are here submitted, will be divided into six 6-inch, two 10-inch, and one 12-inch battery. If you change the number of guns you will change the amount of the estimate. I can submit those figures to the committee later on if you gentlemen do not care to take up the time here now.

FORTIFICATIONS AND INSULAR POSSESSIONS—ALTERATION AND MAINTENANCE OF SEACOAST ARTILLERY.

Mr. SMITH. Then we will pass to the next item: "For the alteration and maintenance of the seacoast artillery in the insular possessions, including the purchase and manufacture of machinery, tools, and materials necessary for the work, and the expenses of the mechanics engaged thereon, $29,500." The note indicates that the purpose of this is to establish a repair shop in the Philippines.

Captain WHEELER. Yes.

Mr. SMITH. Is that supposed to be a sufficient amount to establish a repair shop and equip it, or is this a starter that you are seeking to get?

Captain WHEELER. We have estimated, considering the tools that are already on hand at the Manila ordnance depot, that this $15,000 would provide a sufficient additional number of tools of the right size to enable repairs to be made to the armament which is expected to be mounted in the Philippines, and for that purpose we have estimated that $15,000 would be required.

Mr. SMITH. What is the additional $14,500 required for?

Captain WHEELER. We have estimated that it will take $12,000 to supply the small ordnance repair shops with the necessary tools at Subig Bay, Honolulu, Guantanamo, and Manila.

Mr. FITZGERALD. Why do you ask authority to alter the seacoast artillery in the insular possessions so soon?

Captain WHEELER. In submitting this estimate we have used the wording of the corresponding appropriation for the United States. It is not contemplated that any alterations will be immediately required on these guns and carriages just about to be mounted, but it will permit the alteration, if any should be required, which could not now be foreseen.

Mr. FITZGERALD. The real intention is to create repair shops out of this appropriation?

Captain WHEELER. Yes; repair shops to keep the armament in repair.

Mr. SMITH. At four different places?

Captain WHEELER. Yes.

Mr. FITZGERALD. Is there a repair shop at Manila now?

Captain WHEELER. There is no repair shop at Manila. We have the Manila ordnance depot only. That is not equipped for making repairs to large guns and carriages.

Mr. FITZGERALD. Why would it be necessary to have a repair shop at Manila and also one at Subig Bay? Are they not sufficiently close together?

Captain WHEELER. No. It has been found in this country that in order to be effective it is necessary to have a small shop which is not expensive within a limited district, and the policy has been to assign a small shop to each artillery district; that is to say, to a group of forts in the same harbor. That sometimes is not followed, as in the case of Forts Wadsworth and Hamilton, across The Narrows. They found it so very inconvenient to get materials across the bay, especially in the winter time, that we have a repair shop at each of those places; but the policy is to have but one shop for a group of forts.

Mr. SMITH. Before passing on to the portion of the bill which is under the head of the Board of Ordnance and Fortification, I will ask you now to turn back to page 2 of the bill.

MILEAGE OF OFFICERS TRAVELING ON DUTY IN CONNECTION WITH FORTIFICATIONS FOR SEACOAST DEFENSE.

Mr. FITZGERALD. Do you not want to talk to him about the mileage provision?

Mr. SMITH. That is not a matter to take evidence upon. We can discuss it in the committee.

Captain WHEELER. We consider it very necessary, Mr. Chairman.

Mr. FITZGERALD. What particular advantage to the Bureau of Ordnance is it to have that authority as to mileage?

Captain WHEELER. The appropriations for payment of mileage as now made are hardly sufficient to pay the mileage of the necessary travel for the Army proper, so that the manufacturing departments of the Army are often embarrassed in conducting work under the appropriations under their control. They are frequently prevented from sending officers to points where their services are required.

Under the present law we are authorized to send civilian employees out and charge the cost of their travel to the appropriation under which the work is being performed, but we can not send an officer and pay mileage under any appropriation for manufacture. We are required in the cases of officers to obtain an order from the Secretary of War, in order that the mileage can be paid from the regular mileage appropriation. The result is that the Department is frequently prevented from supervising details of manufacture which really require the attention of the officers rather than of the employees under them; and it is with a view to enable that work to be properly conducted that this estimate, or this proviso for the payment of mileage, is recommended. It would more nearly enable the direct cost of the armament to be determined, because the expense of the travel of officers would be charged to the proper appropriation and would be a proper charge against the appropriation and the cost of the manufacture.

Mr. SMITH. General Crozier has proposed a substitute for this clause, in which he says:

Provided, That hereafter mileage to officers of the Corps of Engineers and of the Ordnance Department traveling on duty in connection with the construction of fortifications and the armament thereof shall be paid from the appropriation for the work in connection with which the travel is performed.

Now, if such a provision is to be inserted, why should it apply only to the engineers and the Ordnance Department, and not also to the Signal Corps and the artillery and the Board of Ordnance and Fortification?

Captain WHEELER. I think there might be occasions where it might properly be applied to the Signal Corps and the Board of Ordnance and Fortification, as well as the engineers and Ordnance Department.

Mr. SMITH. How about the Chief of Artillery?

Captain WHEELER. The Chief of Artillery has one appropriation, submarine mines, and I should say that would be probably one of

the appropriations which could come under the scope of this proviso.

Mr. SMITH. As drawn and put in the bill, it seems to cover every officer, but as drawn by General Crozier and submitted on December 30, last year, for inclusion in this bill it seems to be limited to the Ordnance and Engineer Corps. I do not see why it should be so limited to them and the others kept out.

Captain WHEELER. I think this proviso was submitted by the Chief of Engineers, and not by the Chief of Ordnance.

Mr. SMITH. I have a letter here from the Chief of Ordnance, of date December 30, 1905, in which he says:

I have the honor to acknowledge the receipt of the draft of the fortification appropriation bill that will be used by the subcommittee as a basis for the bill which will be presented for report. It is believed that the proviso at the top of page 21 of the draft of the bill should be changed to read as follows: "*Provided*, That hereafter mileage to officers of the Corps of Engineers and of the Ordnance Department traveling on duty in connection with the construction of fortifications and the armament thereof shall be paid from the appropriation for the work in connection with which the travel is performed." Further remark in regard to this and to one or more minor errors in the draft will be reserved for the hearing.

Respectfully,

WILLIAM CROZIER,
Brigadier-General, Chief of Ordnance.

I am utterly unable to see why or upon what theory this should be made applicable only to the Engineer Corps and the Ordnance, and not made applicable also to the Signal Corps, and the Chief of Artillery, and the Board of Ordnance and Fortification.

Captain WHEELER. I am not very familiar with the details governing the expenditure of the funds of the other departments.

Mr. KEIFER. Is there any wisdom in having a different fund for one class of officers out of which mileage is to be paid?

Captain WHEELER. The question always arises as to whether the numerous trips that the inspectors of the Ordnance Department have to make are a proper charge against the regular mileage appropriation of the Army, in view of the fact that their traveling is required for manufacturing purposes.

Mr. KEIFER. But what is the difference, if it is a purpose of public duty, whether it is manufacturing or something else?

Captain WHEELER. The difference is this: In submitting estimates each year the Paymaster-General would be unable to base his estimate on very accurate information, because a great part of the travel of ordnance officers depends upon the amount of appropriations made by Congress for manufacturing purposes, and also upon the number of different manufacturers who are given orders to make material for which the money is appropriated.

Mr. KEIFER. But would not that same difficulty about making accurate estimates arise also with some other officer than the Paymaster?

Captain WHEELER. The same difficulty would not obtain, because in submitting estimates for carriages or guns or other war material the Chief of Ordnance would be able to make a provision from which the necessary expenses could be defrayed.

Mr. KEIFER. But he would have to estimate what they would be for mileage, as well as the Paymaster-General.

Captain WHEELER. That is quite true; but frequently the Paymaster-General would be unable to ascertain the exact amount of this estimate at the time his estimates are submitted.

Mr. KEIFER. That is a difficulty always encountered.

Captain WHEELER. That is the difficulty he would have in regard to getting information from the manufacturing departments.

Mr. KEIFER. Would he not have the right to call upon the Chief of Ordnance to help him out in his appropriations?

Captain WHEELER. Yes; but the estimates for armament of fortifications are so frequently changed after once being submitted by the Chief of Ordnance that the data supplied would probably not be of any great value.

Mr. KEIFER. My point is that somebody has got to make the estimates for the amount expended for mileage.

Mr. SMITH. On this system, if we would give them a million dollars for mileage, they could use as much of it as they pleased——

Mr. KEIFER. Somebody has to make the estimate. It would have to be taken through the Chief of Ordnance, of course.

Captain WHEELER. The Chief of Ordnance has good data as to the number of trips required in the manufacture of particular classes of articles, and he also understands fully the manufacturers who would probably be required to make the articles for which the money is appropriated. I think the data would be reasonably good.

Mr. KEIFER. With that data furnished to the Paymaster-General, he could just as well include it as anybody else?

Captain WHEELER. He could include it were his estimates submitted at the same time; but, as I said before, the estimates for fortifications are so frequently changed, sometimes three times before they are finally submitted to Congress, it is thought not to be practicable, and if so, that the embarrassment would still exist.

Mr. SMITH. The item last year was stricken out on this theory: The Constitution provides that no appropriation shall be available for the support of the Army for more than two years. This year the appropriations are intended to be available until expended. If you incorporate in a single item here, as, for instance, this item of $2.50 a day at Sandy Hook, the most we could destroy would be that item at Sandy Hook, but if we put in a sweeping clause for paying the expenses of the Army for mileage out of "Fortifications in the insular possessions," for example, in my judgment it would destroy the permanent character of all these appropriations under this head, and they would therefore all lapse within two years. It is said that objections were not raised when this provision was submitted to the Treasury officials at first; but if any of these appropriations is made available for mileage, it clearly makes all of these appropriations coverable in within two years. You can not then make an appropriation, in my judgment, for cannon or carriages that would be good beyond two years. I think the provision here is clearly unconstitutional.

Mr. KEIFER. Your idea is that it might as well include the pay of officers?

Mr. SMITH. Yes; I have never made an objection to including this $2.50 per diem at Sandy Hook. I do not care whether or not that appropriation lapses. They use it up anyway. But if they rely on these appropriations being available until expended, it would be unwise to put in an unconstitutional provision like that. The provision offered last year went out on that account.

CONSTRUCTION OF FIRE-CONTROL STATIONS AND ACCESSORIES.

Now turn back to page 2. We would like to know what is the Treasury balance of that portion of this item of appropriation for construction of fire-control stations and accessories that was awarded to the Ordnance.

Captain WHEELER. We did not get any money under that appropriation last year, Mr. Chairman.

Mr. SMITH. Did you get any of it at any other time?

Captain WHEELER. No, sir; never have gotten any under that.

Mr. SMITH. The Chief of Engineers told us you did; that this money was apportioned out between you—the Ordnance, the Engineers, and the Signal Corps.

Captain WHEELER. That was the intention, but they did not apportion any of it to the Ordnance Department.

Mr. SMITH. What has the Ordnance to do with fire control?

Captain WHEELER. We furnish range finders and other instruments, but last year we had no funds for the purpose.

Mr. SMITH. You say you have never gotten an apportionment from this fund?

Captain WHEELER. Last year was the first time it was combined under this heading.

Mr. SMITH. At one time it was separated?

Captain WHEELER. Yes, it was separated; and last year combined, and the Ordnance Department had no allotment from that appropriation.

Mr. SMITH. The Chief of Engineers thought you did, and of course he told us that according to his recollection. I notice he got the lion's share. [Laughter.]

BOARD OF ORDNANCE AND FORTIFICATION.

If that be true, we are now down to the Board of Ordnance and Fortification, on page 21. You have the balances there?

Captain WHEELER. Captain Dickson is the recorder of the Board of Ordnance and Fortification.

Mr. SMITH. I see you are only asking for $5,000. You are not extravagant this year.

STATEMENT OF CAPT. TRACY C. DICKSON, ORDNANCE DEPARTMENT, U. S. ARMY, RECORDER OF THE BOARD OF ORDNANCE AND FORTIFICATION.

Captain DICKSON. Here is a statement of the funds of the Board of Ordnance and Fortification:

Appropriation, Board of Ordnance and Fortification:		
Treasury balance, January 1, 1906		$237,582.82
Unallotted balance, January 1, 1906		153,844.73
Balance available only for submarine torpedoes	$10,000.00	
Balance available for purchases abroad	4,710.00	
Balance available for expenses of Board and current work	139,134.73	
Total balance January 1, 1906		153,844.73
Allotted at meeting January 4, 1906		57,274.40
Available balance January 5, 1906		96,570.33

Deducting from the balance available on January 1 for expenses of the Board and current work the $57,274.40 allotted since that date leaves $81,860.33; adding to this the $5,000 estimated for and deducting $12,000 for expenses leaves $74,860.33 (of which $14,710 is available only for special purposes) for current work until March 1, 1907, which is a small sum compared with the expenditures made for previous years.

During the past five years the Board has allotted $686,271.84, or an average per year of $137,254.37. Its expenses during this period have averaged $13,254.59 per annum.

The fixed expenses of the Board are:

Salary of civilian member	$5,000
Salary of stenographer and clerk	2,000
Salary of messenger	720
Total	7,720

Mr. FITZGERALD. I see he includes mileage there, on page 21.

Mr. SMITH. It is out now. They have put it in again.

Captain DICKSON. For the reason that the mileage of army members of this Board up to two years ago was always paid by the Board, so that it knew always exactly what its expenses were, as the cost was paid out of the appropriatons of the Board. About two years ago a clause was inserted in the army bill which provided that all mileage thereafter should be paid out of the appropriation for mileage of the Army. Since that time the mileage of members of the Board of Ordnance and Fortification has been paid out of the latter appropriation, and the Board has been hampered because they run short of money. The authorities expect the Board to stop witnessing important tests made out of the funds at its disposal, and of course the Board loses the great advantage of actually seeing the experiments made, which in many cases is essential because, in the case of tests of devices submitted by inventors, the latter are not satisfied unless the Board witnesses the experiments and tests.

That is just enough to cover the salary of the civilian members—that estimate of $5,000 for 1907. We have $96,570.33 now.

Mr. SMITH. That is less than your average annual allotment?

Captain DICKSON. The average for the last five years has been practically $138,000 a year.

MONDAY, *January 29, 1906.*

SUBMARINE MINES AND ARTILLERY.

STATEMENT OF BRIG. GEN. SAMUEL M. MILLS, CHIEF OF ARTILLERY, U. S. ARMY, ACCOMPANIED BY CAPT. JOHNSON HAGOOD, CAPT. D. T. MOORE, AND CAPT. J. M. WILLIAMS, U. S. ARMY, ASSISTANTS TO CHIEF OF ARTILLERY.

Mr. SMITH. General, we will take up certain items that we want to interrogate you about first, and then if you want to make any further statement we will be glad to hear you thereafter.

RANGE FINDERS AND OTHER INSTRUMENTS OF FIRE CONTROL.

On page 2 of the bill before you is the first item we wish to call your attention to. The first question I would like to ask you is this: Do you know whether the Engineer Corps furnishes any range finders at all to you under this item?

General MILLS. No, sir; the Ordnance Department furnishes those.

Mr. SMITH. Do you know why these words, "for the purchase, manufacture, and test of range finders and other instruments for fire control at the fortifications," occur in the fourth line from the bottom? Ought not that clause to be stricken out here?

General MILLS. No, sir; I think not. It is in one appropriation, but it is divided up among three construction departments—the Engineers, the Ordnance, and the Signal Corps.

Mr. SMITH. The Ordnance claims they have never gotten anything out of this last year.

General MILLS. They did not require it, because they had enough instruments and range finders on hand.

Mr. SMITH. Then they have another clause in the bill for range finders under the control of the Ordnance—a separate item.

General MILLS. Possibly that may be for the insular service.

Mr. SMITH. Does the Ordnance have any range finders to cover except for fire control?

General MILLS. No, sir; not for any other purpose that I know of, except submarine mines and insular possessions and field artillery and coast artillery.

Mr. SMITH. Is this item intended to cover the fire control both in the field and in the fortifications?

Gen. A. W. GREELY, Chief Signal Officer. No; it is only intended to cover the coast defense. I might say about this item that the Secretary of War required several bureaus of the Department to make an estimate, and they have consolidated the whole affair so that neither one of us gentlemen can tell about it more than what relates to his own particular department. It was consolidated.

General MILLS. The Chief of Artillery makes the recommendation of what portion shall be allotted to the Chief Signal Officer, to the engineers, and to ordnance.

Mr. SMITH. There should not be separate items here at home for coast defense unless some were intended for use in the field and others for the fortifications proper.

Mr. KEIFER. I think the other item is on page 10 under another head, "Range finders and other instruments for fire control at the fortifications and in the field batteries, and the machinery necessary for the manufacture at the arsenals."

Mr. SMITH. It seems to me this item should not appear in both places. There seems to be some mistake.

Captain MOORE. That item is meant to cover the range finders for the field artillery.

Mr. SMITH. You mean on page 2 or page 10?

Captain MOORE. I mean on page 10. Up to last year it read that way. They put in the old reading. "Range finders for fire-control system at forts" should go out.

Mr. SMITH. You suggest by way of modification of this language to strike out of the item on page 10 the words "at the fortifications?"

Captain MOORE. Yes.

Mr. SMITH. So that it would read, "range finders and other instruments for fire control in field batteries?"

Captain MOORE. Yes.

General GREELY. About the field batteries, I should explain that to the committee, because that was done on my recommendation. There was never any fire control for field artillery except since the Japanese-Russian war. But the important work done there showed the absolute necessity for it. I recommended it and the General Staff approved it. There has never been any estimate for it before. That is absolutely new for field batteries.

Mr. SMITH. You mean for some other prior year, General?

General GREELY. There never was any field-fire control before. There never was any such system before.

Mr. SMITH. It is in the bill for last year.

Captain MOORE. We have had some artillery range finders for a number of years. This specifies for range finders for field batteries, you see.

Mr. SMITH. This entire language on page 10 was in the bill last year without modification. This language on page 2 is now limited to instruments of fire control at the fortifications. We understand that now.

Mr. KEIFER. What is that?

Mr. SMITH. The language on page 2, in the third line from the bottom, for fortifications.

Mr. KEIFER. Yes.

Mr. SMITH. If you strike out the range finders at fortifications, on page 10 of the bill, that item will not be duplicated.

Mr. KEIFER. I want to ask the General whether the appropriation now provided on page 2 of the bill, "for the purchase, manufacture, and test of range finders" at fortifications, is sufficient without having it supplemented by the provision on page 10?

General MILLS. No, sir. We would require to have that on page 10 for the field artillery, especially.

Mr. KEIFER. But there is nothing for range finders except "at the fortifications," as provided on page 2.

General MILLS. Yes; for the seacoast fortifications.

Mr. KEIFER. And striking out the words "at the fortifications" on page 2 of this bill would not cripple you in the use of money which we are going to appropriate for the two purposes? I did not know whether you get part in one and part in another.

General MILLS. It must be in on page 2.

Mr. KEIFER. There is enough appropriated for that?

General MILLS. Yes.

Mr. SMITH. There is $60,000 in the other item for range finders.

General MILLS. I am not responsible for that language. I see that there is apparently a duplication there.

General GREELY. I would suggest that the Ordnance people would know all about it. That is the business of the Chief of Ordnance, you know.

Mr. SMITH. I do not think he quite caught the idea here, and he did not give us the correct information.

General GREELY. He ought to know. He is the one who revises these estimates.

General MILLS. You see the note on page 10. It says:

NOTE.—Estimated to procure for mobile artillery 60 battery-commanders' rulers, 80 battery-commanders' telescopes; 27 plotting boards, and 27 range finders; and for coast artillery, 32 depression position finders, 60 observation telescopes, 125 azimuth prediction boards, 125 wind component indicators, 310 scale arms for harbor charts, 535 frames for battle charts, 360 frames for difference charts, 200 difference charts and abridged range tables, 35 deflection scales, 35 set forward charts. The estimate also covers expense of converting 150 Pratt ballistic boards to range boards, and of the necessary machines, tools, inspection, etc.

The board on the preparation of drill regulations for field artillery has adopted a system of fire control, and the instruments estimated for are required for the 35 batteries completed and under manufacture and for the 18 batteries estimated for herein.

The system of fire control and direction for seacoast artillery, as revised by the Chief of Artillery, was approved by the Board of Ordnance and Fortification on April 6, 1905, and by the Secretary of War on April 19, 1905.

The instruments, boards, etc., estimated for, added to those already procured, are sufficient to complete the general installation for the armament now installed in all seacoast forts in this country so far as the details of the system have been worked out for the different posts. All forts should be supplied with these instruments as quickly as possible to enable the troops to use the adopted system, which can be done with improvised systems of communications, range towers, etc. It is therefore recommended that the making of separate appropriations for the instruments, etc., furnished by the Ordnance Department, be continued this year.—*A. H. Russell, Lieut. Col., Ord. Dept., U. S. Army, Acting Chief of Ordnance.*

Mr. SMITH. Those last mentioned are for the seacoast artillery, and $60,000 of this estimate here is for seacoast artillery, whereas this other appropriation covers range-finders for fire control at the fortifications.

Mr. KEIFER. That brings me, General, to what I am trying to get at, whether you have enough appropriation to cover all the things intended to be covered on page 2?

General MILLS. Let me have one of my assistants interpret this, if you please.

Captain HAGOOD. The estimate for "fire control at the fortifications" on page 2 is supposed to be the consolidated estimates for all seacoast artillery fire control instruments, stations, accessories, and everything except those intended for mine defense. The amount estimated is one and one-half million dollars, which is not sufficient to provide for all seacoast fortifications. It is only a certain amount that was expected to be put in this year. That was to be divided, on the recommendation of the Chief of Artillery, between the Signal Corps, the Engineers, and the Ordnance Department—those three. The idea is that one corps should not independently get part of the money and put in their installation and another corps get their part and put in theirs. Prior to last year these were each estimated for separately, and the departments therefore worked independently. Now the money is so divided that whatever amount is appropriated they can all work together.

Apparently the Chief of Ordnance has put in an estimate on page 10 for position finders, telescopes, prediction boards, wind component indicators, scale arms, etc., over and above what has been asked for in this general appropriation act. The Chief of Artillery did not know of this item, and it would have to be looked up a little before we could answer exactly what it is.

Mr. SMITH. This item on page 2 was supposed to include a properly balanced amount for these things. Now comes this other, and in it we are asked for $60,000 more for range finders.

Captain HAGOOD. That was the estimate which the Chief of Ordnance put in.

Mr. FITZGERALD. How much did the Ordnance get of that?

Mr. SMITH. Nothing.

Mr. FITZGERALD. Who gets it?

Mr. SMITH. It is expended on the balance of the artillery. The Ordnance Department got nothing last year because it had a sufficient surplus on hand out of previous appropriations to balance this fund.

Captain HAGOOD. The point of that is this: There was no use in giving the Ordnance Department any of the $1,000,000 appropriated last year to buy instruments, because the Engineers had not yet built the stations to put them in and the Signal Corps had not put in the communications. Therefore there was no use to buy for the Ordnance Department any instruments. My understanding is that this item, on page 10, is the estimate of the Chief of Ordnance of the money necessary to buy all the instruments over and above what we estimated for in this item on page 2. I think the Chief of Ordnance ought to be heard on this. So far as the Chief of Artillery is concerned I do not think he would recommend that item on page 10 at all.

Mr. KEIFER. That is what I wanted to get at. If we left in the appropriation for "range finders and other instruments for fire control at the fortifications," on page 2, and struck out the similar item on page 10, will there be sufficient to cover your needs in the appropriation provided for on page 2?

Captain HAGOOD. It will be for the next fiscal year; yes, sir.

Mr. SMITH. And the $90,000 independent of this estimate of $150,000 on page 10 is not covered on page 2?

Captain HAGOOD. No, sir.

Mr. FITZGERALD. Do you know whether this item on page 10 is intended to cover the mobile artillery at the fortifications, as distinguished from the fixed artillery——

Mr. KEIFER. Yes; that is the point——

Captain HAGOOD. Down to the second line it says, "for mobile artillery," and the rest of it says, "for coast artillery." Ninety thousand dollars is for the mobile artillery—that is field artillery, and $60,000 is for the coast artillery. That is on page 10 in the notes.

Mr. SMITH. You will see the language used on page 2 is broad enough to cover the field artillery used at the fortifications. A small amount of field artillery is contemplated to be used at the fortifications?

General MILLS. Yes.

Mr. SMITH. This is for range finders at the fortifications?

General MILLS. It is movable artillery.

Mr. SMITH. Well, gentlemen, I do not know whether I can get much more from General Mills on this subject. Perhaps we had better pass on.

FIRE CONTROL AT SEACOAST FORTIFICATIONS.

Now, General, have you now got a standard plan of establishment of fire-control system at fortifications, and if so, how long has it been established?

General MILLS. We have a very well perfected system at this time. There have been changes more or less modifying the established system for the last three or four years. The system has been going through this evolution, but latterly now, in the last year or so, in the last year particularly, we have made very considerable advances, and we have settled upon a great many doubtful points. We have adopted

the plan of localizing the system more particularly. We had originally a fixed system applied to practically every place, but we found we had to modify that fixed system for certain localities, particularly on the Pacific coast, and we now have got it pretty well thrashed out.

We can almost say we will not make any particular changes in the next year or so, and perhaps not for some time after that, so that I believe that every dollar appropriated now could be expended on a pretty well established system. The three departments which are particularly interested in it, the Signal Corps, the engineers, and ourselves, the artillery, are pretty well settled upon that part.

Mr. SMITH. These other branches have very little to do with the actual plans?

General MILLS. Nothing but suggestion. When we come to put in an installation they can suggest modifications in one particular or another where it would not be changing the plans materially.

Mr. SMITH. Their functions have been simply suggestive in that, and you have been charged with the responsibility?

General MILLS. Yes; their functions are mainly suggestive. We have the responsibility. I have an officer who is familiar with all the details and can actually tell of every dollar expended in the last year at any particular post for any particular purpose.

Mr. SMITH. We would be glad to hear him, then, as talking for you. As a matter of fact you have entirely changed the size, have you not, of your primary stations?

General MILLS. Yes.

Mr. SMITH. How recently have you changed the size of the primary stations?

Captain HAGOOD. Since we began to install the permanent fire-control system we have not changed the fire-control stations at all. Originally the fire-control installation was put in, based upon the Barrancas test, the stations which they established down there were of a certain size, and since then there have been certain modifications and improvements in the designs of some of the instruments. The plans for new stations have been changed accordingly, have been made a little more commodious, maybe a couple of feet on each side, but the stations actually built have not been changed or modified.

Mr. SMITH. Have you not built and rebuilt some of the primary stations?

Captain HAGOOD. No; except that those we had in high towers have been replaced by others nearer the ground. We have also added sleeping quarters for the men assigned to the stations. Those are practically the only changes made in the size of stations.

Mr. SMITH. Have you not in fact rebuilt some?

Captain HAGOOD. The stations put in under the old system, prior to the establishment of what we call the Barrancas system, the one we are now putting in, have been modified in accordance with the new system. We have had fire-control stations of one kind or another since 1898, but those old 1898 stations have in some cases been modified in order to be brought up to the modern requirements.

Mr. SMITH. When did you conclude that you had established your modern system?

Captain HAGOOD. The modern system was established, you might say, at the time of the Barrancas test, in 1903, and we have never changed a station that was built under that system. Yet sometimes

slight modifications are adopted, just as you do in the case of guns. You may make a battery this year, and next year, when another engineer officer goes to build a new battery, he may make a little change or modification in the new battery, and in the same way progress is made in consequence of experience in this fire-control station. Last year they built some stations in which the distance between the observing room and the plotting room was 5 feet. This year in building stations we put the observing room up a little higher.

General MILLS. We have not rebuilt any stations, but in building new ones we have made those changes.

Mr. SMITH. Since 1903?

Captain HAGOOD. Yes. Prior to that time we had no regular system, because the policy was to put in the stations from the regular appropriations they had from year to year—to put in what we could all over the country; but, starting in last year, we decided to take up one harbor at a time and put in a complete system.

This year we are putting in complete systems at New York, Boston, and Portland. Next year we expect to go to San Francisco and Puget Sound and put in a complete system, the best we have got. Next year, when we put in San Francisco, we shall take advantage of our experience from year to year in putting in the fire-control system, just as in building battle ships they take advantage of experience, and each ship is an improvement on the last.

Mr. SMITH. Is it not a fact, General—and I say this without any intention to give offense—is it not a fact that practically not a month has gone by throughout the last year in which you have not sent up some new scheme for fire control to the engineers or the ordnance?

General MILLS. There has possibly been a suggestion, only a suggestion, as to new construction, but nothing that would interfere with any expenditure already made. As to those stations, you must remember that this office of chief of artillery was not established until 1901, so that there was no general central direction of this fire control in existence. The Engineer Corps had built stations in 1898, but it had never been centrally directed from the office of the chief of artillery until that office was established in 1901. Since I have been chief of artillery we have had suggestions to make—that has only been in the last few months—and we have found it necessary, particularly after our visit to the Pacific coast and to stations there under the auspices of the Taft board to solve many new problems or questions that hitherto had been suspended. The chief signal officer was a member of that committee or board. We saw questions suspended and held up awaiting examination, and so we have suggested a good many changes in the new construction, but nothing involving any expenditure that has already been made, I think.

Mr. SMITH. Of course we are very glad to hear that you have changed this plan of finishing the system at many places at once. The old committee was dissatisfied in the past with that system of spreading this unfinished plan, as we thought it to be, all over the country, whereby when you discovered any improvements you had to replace them all over the country. It is very gratifying to learn now that you have adopted this other system.

General MILLS. The permanent system?

Mr. SMITH. Yes; to finish one place and find out the defects before going to another place.

General MILLS. We have had to make a provisional arrangement, also, throughout the country for target practice and instruction purposes.

Mr. SMITH. How much have you expended in the last year for temporary work?

Captain HAGOOD. We have not got a consolidated statement from the engineers, the signal corps, and the ordnance of the amount they have expended, or the actual figures of the amounts showing the items of cost, although we have here a list of places where what you might call temporary work has been put in. But it must be borne in mind, when you speak of temporary structures, that a board of officers has visited every post in the United States and recommended sites for permanent installation, and what we have put in for temporary work is on the sites of the permanent work and is intended to be included eventually, to a greater or less degree, in the permanent work.

Mr. SMITH. You do not mean that exactly when you put wires overhead down here—you do not mean to keep them overhead always?

Captain HAGOOD. I was going to say except as to wires, cables, and so on. We propose to put the wires underground, but so far as the stations are concerned the instruments purchased and the general lines and general policy of the station at a particular harbor, we expect those to be permanent.

Mr. SMITH. You have not put up permanent buildings?

Captain HAGOOD. Buildings just of the same type as permanent buildings. The buildings we put up at Charleston last year as a part of the temporary installation are identical with those put up in New York in the permanent installation.

Mr. SMITH. When you put in permanent installation you put in cables underground?

Captain HAGOOD. Yes.

Mr. SMITH. So that these overhead wires can not be utilized again?

Captain HAGOOD. Those wires have been used almost entirely from material already on hand, and the policy now is not to purchase any new material with which to put in temporary installations.

Mr. SMITH. You can not give us any idea of how much has been expended for temporary work, by reason of your lack of facts or information assembled from the different bureaus concerned?

Captain HAGOOD. No; I could not give you an estimate of the total amount. Practically all the money expended for installation of fire control up to this time, except in the harbors of New York, Portland, and Boston, we consider as for temporary installation, because when we come to those harbors we can not say, until the time comes, exactly how much of the temporary work we can utilize.

Mr. GRAFF. Somebody testified in these hearings that it was not really determined yet, or officially determined, whether it was best to bury the wires or not——

Mr. KEIFER. In all cases——

Mr. GRAFF. And that their investigations upon that subject were not altogether satisfactory.

Mr. KEIFER. That is my recollection, too.

Mr. SMITH. The testimony was that cables, as buried in the ground, were not altogether safe, but I do not think the witness stated that they were in doubt as to the policy. I don't know whether they had decided which was the safer, buried or overhead.

Mr. GRAFF. Yes, he said that the plan adopted was not altogether satisfactory.

Mr. BRUNDIDGE. At how many points did we understand you to say that this one and one-half million dollars would complete the installation of fire control?

Captain HAGOOD. It would probably complete the installation of Puget Sound, San Francisco, and what is uncompleted in Chesapeake Bay. A good deal of that is already completed. It took a million dollars to complete New York, Boston, and Portland.

Mr. BRUNDIDGE. New York is not completed yet, is it?

Captain HAGOOD. The money has all been allotted. We are putting in the installation now. In our office we consider it is complete, so far as our office is concerned.

Mr. SMITH. When these estimates were made a year ago you thought this would complete it at six places?

Captain HAGOOD. Yes.

Mr. SMITH. As a matter of fact, this is growing in expense beyond any expectations you had when you started, is it not?

Captain HAGOOD. This administration was not in at the time of the origin of the system; but I believe it is more costly than it was originally thought it would be.

Mr. SMITH. Two years ago, in the regular annual estimates furnished to Congress, it was estimated this would cost about $1,200 per gun. At a subsequent time, during that same session of Congress, a supplemental estimate came in to the effect that it would cost more than $4,000 per gun. On the basis of your estimate at that time you obtained these appropriations, and it was then estimated, when you got the appropriation last year, that it would cover six points. We are now informed by other officers of the Army that it has been found sufficient only for three points, which leads us to suppose that the estimates must be now somewhere from $8,000 to $10,000 per gun. How is that?

Captain HAGOOD. Out of this appropriation for fire control last year came the installation that was put in at Chesapeake Bay for the maneuvers. For instance, down here on the Potomac, the installation is 90 per cent finished—the permanent installation. The Signal Corps is 90 per cent finished, and the engineer work is practically completed; so that we have not only gone into New York, Portland, and Boston, but a great deal of work has been done at these three other harbors.

Mr. SMITH. Have you any information now as to what it will cost per gun to put in these installations of fire control?

Captain HAGOOD. It depends upon local conditions.

Mr. SMITH. But after you have done work at many different places I think you would be able to get an approximately average cost.

Captain HAGOOD. That would vary with the caliber of the guns also. It would be rather unsatisfactory and difficult to describe what it would be per gun generally.

Mr. SMITH. You say it varies greatly with the caliber of the gun?

Captain HAGOOD. Yes. For instance, mortar batteries in some localities have to have three base lines in order to get the proper fire.

Mr. SMITH. That means the location of the gun, not the caliber of the gun?

Captain HAGOOD. Yes. I stand corrected to that extent.

Mr. SMITH. Is there any difference in the expense by reason of the different diameter of the projectile?

Captain HAGOOD. Mortars are of a different class.

Mr. SMITH. Do you know how many guns you have equipped, or how many you have enough money to equip now?

Captain HAGOOD. Yes.

Mr. SMITH. How many have you got, either equipped or enough money allotted to equip?

Captain HAGOOD. I have the figures right here.

Mr. SMITH. While you are looking for that, we will ask General Mills where he gets his money for fire control.

General GREELEY. I was going to suggest, Mr. Chairman, in relation to some of the questions you have asked, that the Board of National Defense, which was appointed by the President, now has its report practically completed. We hope to be able to sign it within the next two or three days, and the Secretary of War will doubtless then send it up to Congress. In that report we have gone over this whole subject, the entire defense for the whole country and our possessions, and have given the number of additional guns required, and where they should be located, and the cost at each station, and all that sort of thing in a table. I give you this for your information. In a few days you will have the whole data as recommended.

Mr. SMITH. We are glad of that. But we may get this bill reported out to-morrow.

General MILLS. I thought I had the information you required. You asked for the number of guns mounted?

Mr. SMITH. No; my last question was where you got your money for fire control in 1904. Was that in a separate item in the bill?

General MILLS. Yes. Here I have a memorandum showing the number of guns. There are now mounted in our coast fortifications:

376 12-inch mortars.
105 12-inch guns.
132 10-inch guns.
96 8-inch guns.
517 rapid-fire guns.

1,226 total.

Mr. SMITH. I wanted to know the number of guns you had there equipped with this fire control, or had allotted from money appropriated for fire control, so that we could tell from the amount of money you have on hand or appropriated the number of guns equipped and about what it was costing on the average per gun.

Captain HAGOOD. I can give you the number of guns in Portland Harbor and the amount of money allotted to Portland Harbor for the engineers.

Mr. SMITH. That is practically an estimate, or entirely so, is it not? You have not got them equipped at Portland yet, have you?

Captain HAGOOD. We have not got them complete anywhere, except that they are being built. I can give it to you as to New York Harbor. They are working down there, the Engineers and Signal Corps——

Mr. SMITH. Is not this work practically completed at New York Harbor?

Captain HAGOOD. At Fort Schuyler and Fort Totten it is practically

completed, but at Sandy Hook it is not complete. At Forts Wadsworth and Hamilton I would say it is 75 per cent complete.

Mr. SMITH. You say it depends upon the size and character of the guns and upon their position with reference to one another? One place is very little guide to us. We would like to get a general idea of about what this whole thing comes to. We do not expect it to be absolutely accurate, but we would expect it to be general. If you can tell us to what guns you have already allotted money, so that you could give us the average cost on those completed and allotted, we would be very glad.

Captain HAGOOD. We could not give it to you, sir, in figures here without considerable figuring. I was going to give you the number of guns at Portland and the amount allotted to them.

Mr. KEIFER. Expended and allotted?

Captain HAGOOD. Yes; or I could give you in the same way the amount allotted to Boston, or New York, or any other one of these districts. It is a very hard thing, however, to say exactly how much it would cost, because a great deal of old installation was utilized or will be utilized in a great many of these places. If we knew exactly what was wanted we could get the figures on it.

Mr. SMITH. Can you tell us how much has been expended for fire control since 1898?

General MILLS. No; it would take some little time to get that up. We could get it up by consulting the disbursing officers, however.

Mr. SMITH. Do you not know, General, when you make a requisition on the Signal Corps, or the Ordnance, for doing any of that work or the purchase of any material, what it costs?

General MILLS. Yes, we have an approximate idea.

Mr. SMITH. So that your office alone would show the complete cost of equipping New York, for example, with fire control?

General MILLS. The Chief Signal Officer reports the figures each month, but no one officer has knowledge of the cost of the whole.

Mr. SMITH. Did you expend any money for fire control out of experimental appropriations of any kind before you commenced to get regular appropriations for this purpose?

General MILLS. I assume the Engineers did. I assume that considerable money was expended by the Engineer Corps.

Captain HAGOOD. Prior to this appropriation of last year the Chief of Artillery did not have anything to do with the dividing up of this money for fire-control purposes. The Signal Corps, the Engineers, and the Ordnance put in their own estimates for fire-control installation, and it had always been done that way up to that time, and the Chief of Artillery did not have anything to do with the amount of money expended for that purpose.

Last year the specific appropriation was made, and upon the recommendation of the Chief of Artillery, in consultation with the Chief of the Signal Service and the Chief of Engineers, the allotment was made by the Secretary of War; so that we could not tell how much had previously been supplied by these different departments on fire-control installation without going through the various records in the three offices and getting them altogether.

Mr. SMITH. You are now in general control of fire control, and you are the department we would naturally look to for this information.

Can you not furnish the committee within a day or two with information showing what has been the entire expenditure for fire control since the scheme was first conceived?

Captain HAGOOD. I can not say how long it will take to get it up. It will depend on how quickly they can give us the information; but I should say it can be done.

Mr. SMITH. We naturally look to you as the general superintendent of this system.

General MILLS. We will be very glad, indeed, to do it. I know the other departments will make special efforts to get it.

Mr. BRUNDIDGE. I would like to ask from what source prior to 1904 have you got these appropriations?

Mr. SMITH. There were special appropriations for the Engineers and Ordnance prior to 1904. A considerable sum was voted for experimental purposes.

General GREELY. Yes; I think the first money used for this purpose was $25,000, which the President allotted to the Signal Corps from the fifty million war emergency defense fund in 1898.

Mr. SMITH. We would be very glad to have in a brief form in that way the total amount of expense up to date on account of the item of fire control. If you will furnish that we will be obliged to you.

General MILLS. Yes.

Mr. SMITH. Now, if we should give you the amount estimated for this year, about what percentage of the guns for seacoast fortifications wonld then be provided for?

Captain HAGOOD. The trouble about telling exactly that information is that they made a very large estimate for San Francisco. The engineers made a very large estimate for the defense of San Francisco Harbor, and we have recently sent out there to recanvass the whole subject, with the expectation of cutting the estimate down very greatly, and it depends on how much they will be able to cut that down. But every battery in the United States to which troops are now assigned has what we call this temporary installation, which is modeled after a permanent type, with the lines of aerial and all that sort of thing.

Mr. SMITH. Is there any defect in the temporary system in case of war now, except the fact that the wires are now overhead instead of being underground?

Captain HAGOOD. So far as it goes, it could be used for defensive purposes. But they have not yet got all the prescribed instruments. They have the minimum which they can use for practice and drill. They have not got all the instruments which are in the improved system. They have the old type of telephone, for example, old material that was on hand, instead of the new type. Instead of having the latest designs of range finders in their secondary stations they have only got azimuth instruments. Their secondary stations are more or less fitted with temporary equipments, and the secondary stations themselves may be said to be extemporized. Any station that they have that can be utilized for practice and drill we consider in a general way to be good enough for the temporary system. The primary stations are as a rule good enough for permanent stations, with certain additions, principally for sleeping quarters.

Mr. SMITH. The azimuth instrument is of no value whatever except in sights called Case III?

Captain HAGOOD. Oh, no. We use them in the horizontal work. We use them in the secondary station when we have a horizontal base line in the temporary system.

Mr. SMITH. I do not mean the secondary station. In what cases do you classify them? I understood you classified them into cases I, II, and III.

Captain HAGOOD. Yes.

Mr. SMITH. In Case I you do not use the azimuth in fire control?

General MILLS. We have to get the range of the target.

Captain HAGOOD. The division between Case I, Case II, and Case III is not dependent on the fire-control installation?

Mr. SMITH. It depends on the manner in which the guns are handled?

Captain HAGOOD. Yes.

Mr. SMITH. We understood from the testimony heretofore given that Case I was where the gun was fired by sight from the human eye.

Captain HAGOOD. Yes, with the sight on the trunion aimed directly at the target. The sight has to be previously set, though, for the deflections and so on, which is determined by the speed of the vessel, the velocity of the wind, etc., and for the range. All of this is determined by the fire-control system.

Mr. SMITH. Now, under Case II the altitude is determined by the fire-control system?

Captain HAGOOD. The elevation is simply laid off on the elevation wheel instead of being laid off on the sight.

Mr. SMITH. It is not all dependent upon the accuracy of the human eye in Case II? It is determined by fire control?

General MILLS. The fire control has to be used only to get the range of the target and plot it and determine its direction, etc. In all cases we have to use the fire control—that is, the stations, the observation stations, and the instruments to observe the targets.

Mr. SMITH. Case I is supplied this information?

General MILLS. Yes.

Mr. SMITH. And the gun is then aimed——

General MILLS. From this knowledge and by applying the rules.

Mr. SMITH. And Case II is where the sight is fixed mechanically by the fire control?

General MILLS. Yes, from knowing the distance of the target.

Captain HAGOOD. The point of it is this: You could not possibly shoot in Case III without some sort of fire-control system. You could shoot point-blank range by a guess in Case I without a fire-control system; or you could guess at the range in any other system; but as a matter of fact we do use the fire control in all three cases.

Mr. SMITH. In Case II the elevation is absolutely controlled by the fire-control system?

Captain HAGOOD. No more so than in Case I.

Mr. SMITH. That was the explanation given here the other day.

Captain HAGOOD. You are obliged to know the range in any case. If you are aiming in Case I, you have the elevation scale in sight, and then you aim directly at the target; but in Case II, instead of setting it at the sight, you set it down below. You have to know the range in either case, and the only way to find the range is by the position-finding service.

Mr. SMITH. So you claim this fire control is necessary in all cases?

General MILLS. It is useful in all cases.

Mr. SMITH. We have understood that Case I was an old system of firing, used before the fire-control system was devised.

Captain HAGOOD. You may say that before they had the fire-control system they never used Cases I and II, but find on the same principle that an infantry soldier does when he sets the sight leaf on his rifle by the eye. But in Case I, if he estimates by the eye, he is no more apt to hit than if he does the same thing in Case II or Case III.

General MILLS. Previous to the fire-control system in our target practice we had to send men out in boats, Mr. Chairman, on the flanks of the target to see whether the shots were going over or short—going beyond or short of the target. That was prior to 1898. That was the only method we had then. That evolution has taken place in three or four years. We had the telephone and the flag signal, and then we sent information in addition by word of mouth. This fire-control system has increased the artillery efficiency or effectiveness 100 per cent. We have got the guns and the powder, and we lack only this complete fire-control installation.

There is no other nation that has perfected the system as we have it now. No hostile fleet could lie off one of our harbors now, 10 or 12 miles off, and bombard any of our harbors. That is impossible. The whole Taft board is now recommending things based upon the improvements recommended in this fire-control system. It has cost a lot of money, but we are now amply repaid for it.

Mr. SMITH. Do not understand, General, that anybody in this committee has any doubt as to the value of fire control. The only doubt in the minds of the committee is how fast this installation ought to go; as to whether it has been so standardized, or is at this time so standardized, as to justify its completion everywhere, or whether it should be completed only in a few places first and afterwards extended to other places.

General MILLS. They are complaining very much on the Pacific coast because we have not gone out there yet. We are going out there next summer and are going to put in installations, and we are pretty well satisfied as to the kind we want.

Mr. SMITH. You say you have increased the firing efficiency 100 per cent? I understood you had increased it 400 per cent—the efficacy of the fire 400 per cent. Was not that claimed last year?

General MILLS. I do not know.

Mr. GRAFF. That is simply dependent upon the degree of enthusiasm of the officer who gives the estimate, is it not? [Laughter.]

Mr. SMITH. Do not the target records show an improvement of more than 100 per cent?

General MILLS. I do not know as to that; but I know we can hit a target at five or six thousand yards nine times out of ten.

Mr. FITZGERALD. Now, as to the permanency of this fire control, you say you have practically completed it in New York Harbor—that is, you have made your allotment and plans?

Captain HAGOOD. Yes.

Mr. FITZGERALD. How much of this work being done there would be rendered useless by the additional works contemplated or rendered necessary by the opening of the Ambrose channel?

General MILLS. None. There is not an advanced idea found out or originated by any department that we are not following ourselves and will follow until the last minute.

Mr. FITZGERALD. Will all this work being done there now still be useful and necessary after all arrangements are made for the improvement of Ambrose channel?

General MILLS. Yes.

Mr. FITZGERALD. I saw it stated—I do not recollect where—some time ago, that by reason of the improvement of that channel some of he defenses would be rendered ineffective.

General MILLS. On the Taft board we have found that we had, on account of that, to introduce some more guns. I am a member of the Taft board, and I bring every information gained from that board back to my office, and Captain Hagood utilizes it up to the very latest date.

Mr. FITZGERALD. My question is, Will any of this work that is being done now be rendered useless by the change in the approach there by way of Ambrose channel?

General MILLS. Not at all. It is being done in anticipation of the change in that approach.

Captain HAGOOD. We are estimating in the fire-control system for New York Harbor some necessary additions on account of the recommendations for increased armament which the Taft board has made on account of the opening of the Ambrose channel.

Mr. FITZGERALD. I suppose the same conditions will exist in most of the large harbors of the country, and if changes are made from time to time it is necessary for us to understand what part of the work now being done would be called obsolete.

General MILLS. We had to make a change in Boston on account of that new channel there. We had to make provisions for a new battery there to reach that channel. When the Taft board submits their report that will be completed.

Mr. FITZGERALD. When this work in New York is complete, will that cover all the recommendations to be made by the Taft board?

General MILLS. Yes.

Captain HAGOOD. These things go in as units. When a new battery goes in, it goes into the general scheme with its fire-control system. It is simply an addition.

Mr. SMITH. Has that change in Ambrose channel just been made, or is it now going on, merely?

Mr. FITZGERALD. In a year half of it will be opened to a depth of 40 feet, 1,000 yards wide, and instead of making a big detour around the Hook, the vessels will come right in from the center. I was under the impression that these batteries had been placed not with a view to attacking vessels attempting to come in at the Ambrose Channel, but covering the old channel.

General MILLS. Yes; but we have put in a new mortar battery and a new 12-inch gun battery and other defenses to meet those changes. These complete it. This is corrected up to date. Fire-control plans are incorporated with the gun defenses.

Mr. KEIFER. You follow that policy everywhere?

General MILLS. Yes.

Mr. FITZGERALD. Did you find out what part of this million dollars was allotted to them?

Mr. SMITH. Nothing was allotted to them. They furnish the plans and requisitions, and the Ordnance does the work.

Mr. FITZGERALD. This is to be divided between the Ordnance and the Signal Corps?

Mr. SMITH. I understand it so.

General GREELY. I made my estimate and the Secretary of War consolidated the figures. I was allotted somewhere about $450,000, or something like that.

Mr. SMITH. Four hundred and forty-five thousand dollars. I think I have a note here that $550,000 was allotted to the engineers, and that you got the balance.

General GREELY. Yes.

Captain HAGOOD. It was $590,000 to the engineers and $410,000 to the Chief Signal Officer.

SUBMARINE MINES.

Mr. SMITH. Now, turning to page 16 of the bill, General, we come to the item which is under your control—submarine mines.

General MILLS. Yes.

Mr. SMITH. I will say to the committee, and the General will correct me if I am wrong, that this is the only item in the bill that goes directly to the artillery. Is that right, General?

General MILLS. I am not a disbursing officer. I do not disburse any money. We conduct the submarine service, but this is under the Ordnance Department.

Mr. SMITH. This subject of submarine mines is under your control?

General MILLS. Yes; but they audit it.

Mr. SMITH. That was my understanding. Now, in this item, what is the present estimated amount necessary to complete the submarine defense?

Captain MOORE. Thirty per cent.

Mr. SMITH. Have you changed it in any respect since last year?

Captain MOORE. In one or two respects, because the Taft Board has recommended that mines be put in at Cape Henry; more than 10 miles of water has to be covered there. They took two or three points out, however, as, for example, Fort Knox and Fort Fremont, down in South Carolina, and San Pedro, in California. Otherwise the estimates remain practically the same.

Mr. SMITH. Your estimate was $4,000,000 last year?

MINES AND MINING CASEMATES.

Captain MOORE. No, sir; there are two items here for mines——

Mr. SMITH. I am asking you what is the amount necessary to complete the submarine defense of the United States. I think you told us last year it was $4,000,000. That is my recollection. I may be wrong about it.

Captain MOORE. The total amount required now is $3,796,432. That is for buildings and everything pertaining to submarine mines—the fire-control installation, and the mines themselves, and the buildings, and boats, and searchlights, and everything.

Mr. FITZGERALD. Is that in addition to the amount estimated for this year, or does that include the appropriation of last year?

Captain MOORE. You mean the actual appropriation up before the committee now?

Mr. FITZGERALD. Yes.

Captain MOORE. It includes that.

Mr. SMITH. Do you remember the page on which occur the other items of submarine defense?

Captain MOORE. It was on page 6 of the appropriation. The estimate amounts to $175,000.

Mr. SMITH. I do not see where we have that other item.

Mr. FITZGERALD. There is an item at the bottom of page 5, "For preservation and repair of torpedo structures," and another item at the top of page 6, "For the construction of mining casemates," etc. For preservation and repair the amount estimated is $50,000.

Captain MOORE. It is just after that.

Mr. FITZGERALD. For the construction of mining casemates?

Captain MOORE. Yes.

Mr. FITZGERALD. That is on page 6. The amount is $175,000.

Captain MOORE. Yes.

General MILLS. Will you let me read to you a memorandum which I have prepared under that item?

Mr. SMITH. Does this cover the two items or the one?

General MILLS. Only the one.

CONSTRUCTION OF MINING CASEMATES, CABLE GALLERIES, ETC.

(Reading:) "The amount appropriated by Congress for the construction of cable galleries, mining casemates, etc., last year was $400,000, and with this amount, the whole of which has already been allotted or expended, we were able to complete the minor buildings necessary for the defense of the following harbors:

"New York, both entrances (excepting wharves at Wadsworth and Totten).

"Boston.

"Portland (exception of wharf at Fort Williams).

"Washington.

"Chesapeake Bay (Fort Monroe with the exception of a loading room).

"Baltimore.

"Delaware (Wilmington and Philadelphia).

"Besides the above, a certain amount of work was done at each of the following harbors:

"Eastern entrance to Long Island Sound (New London).

"Charleston.

"Pensacola.

"From the above list it will be seen that no work whatever was done on the Pacific coast, as it was thought better to finish as soon as possible the defenses of our Atlantic coast, as they are very much nearer to any prospective enemy than our Pacific ports possibly could be.

"At the time the estimate of $540,700 was submitted the proceedings of the Board appointed to report upon the mine defenses of the forts on the Pacific coast and to submit estimates in connection therewith had not been received and consequently only forts located on the Atlantic and Gulf coasts were included in the estimate. This estimate of $540,700 was, however, cut by the direction of the Secretary of War to $175,000; in other words to approximately one-third of the amount estimated for. It is supposed that this cut was made so as to

spread this construction work over a period of three years, as the Secretary adopted this policy for the mine material under the misapprehension that the total amount required for our entire coast line was $540,700. Since this estimate of $540,700 was submitted to the Secretary of War the mine projects for the Pacific coast have been received and approved, and we have been able to determine the amount required to complete the mine buildings for our whole coast line and find it to be approximately $1,018,637.

"It is therefore respectfully urged that the estimate be raised from $175,000 to $303,300 (approximately one-third of the total amount required). As you know, this appropriation is used for the construction of the necessary buildings for our mine defenses, such as casemates, cable galleries, cable tanks, loading rooms, wharves, storehouses, range towers, etc., without which it would be impossible to operate our mine defenses effectively in time of war, or to keep them in proper condition in time of peace.

"For instance, if we have not got casemates we can not properly protect the dynamos, oil engines, storage batteries, switch boards, and other necessary electrical apparatus. If this expensive equipment is not kept in first-class condition at all times it would deteriorate very quickly, would soon become useless, and in event of war our whole mine system would prove worthless.

"Cable tanks are required to store the submarine cable needed in connection with our mine fields, as it is a well-known fact that cable must be stored under water, otherwise it will deteriorate very quickly and soon become useless. The average cost of a cable tank complete, that is to say with the necessary gear to handle the heavy cable drums, is $6,000. Of course this varies very considerably with the location and size of the tank required. For instance, the cable tank at Fort Terry, N. Y,. will cost approximately $7,300, and is designed to hold 44 miles of 19-conductor cable and 40 miles of single conductor cable, the total value of which is $99,200. If we have this cable tank we can keep the cable in good condition indefinitely, say for fifteen or twenty years; whereas, if we are forced to store it in some other way it will deteriorate very rapidly; in fact, practical experience has demonstrated that it will be useless at the end of two years.

"The storehouses are needed in which to store the other parts of the mine property such as mine cases, mine anchors, mooring cable, rope, etc., all of which to be kept in efficient condition for immediate use must be protected from the elements.

"*Wharf.*—One of the most difficult questions that we have had to solve in connection with our mine defenses. A wharf to be suitable for mine work must fulfil the following conditions:

"1. It must be substantial enough to stand the great strain that will be brought upon it by having mine anchors, mine cases, cable drums, etc., piled upon it.

"2. It must be constructed far enough out to permit a boat drawing 18 feet to tie up to it at any tide.

"3. It must be located in such a position that a boat can tie up to it in any weather; in other words, it must be in a protected position.

"4. It must be equipped with the necessary tramways, cranes, etc., so that the mine apparatus can be handled expeditionsly and with ease.

"5. It must be available for mine work, and for mine work only, at the outbreak of war, as nothing should be allowed to interfere with the

immediate mining of our harbors as soon as war is declared; consequently at that period the wharf should not be used for the handling of other supplies, and it must be remembered that just at this time all sorts and kinds of supplies will have to be sent to our forts, which will lead to congestion and disorder, as past experience has shown that just at this time we will be very short on trained officers and very long on green men."

Mr. SMITH. Has this been communicated to the Secretary of War with the request that he transmit supplemental estimates?

General MILLS. The Chief of Engineers told me this morning that he had been trying for three days to see the Secretary to get his permission to talk about this, but I think he told me he had mentioned it to the committee, and did not have all the data when he talked with you about this subject. He told me that this morning. I think if he had had at that time all the information which he now has, the Secretary of War would not have cut him down. But we did not have all the data in at that time.

Mr. SMITH. As I remember it, your predecessor estimated a year ago that this submarine-mine defense would cost $4,000,000. We then gave $700,000, and now the estimate is about $3,700,000.

Captain MOORE. No; $3,538,691; and in this estimate there are included points which were not included last year; for instance, the entrance to Cape Henry. The ones that are excluded do not amount to much. For instance, for Fort Knox, one that was knocked out, the whole estimate was only $34,000, whereas for Cape Henry, which was put in, the estimate was $473,000. The channel between Cape Henry and Cape Charles is about 8 or 9 miles wide, and they want that whole channel mined.

Mr. SMITH. If it is not premature to ask you, may I inquire if the new plans of the Board contemplate the fortification of Cape Henry?

General MILLS. I can answer that readily. They do. A very elaborate system of defense is provided for.

Mr. SMITH. So that according to your idea the increase in the estimates for the completion of the work lies chiefly in the new project at Cape Henry?

Captain MOORE. Practically; absolutely. Of course, there is another reduction here at Fort Fremont. That only amounts to $74,000.

Mr. SMITH. You understand, gentlemen, that one of the embarrassments of this coast-defense matter is that the former Chief of Engineers reported that this system was complete, and immediately after his successor was installed the Department informed us that it would require $4,000,000 to complete the system. [Laughter.]

Mr. KEIFER. When did he make that statement?

Mr. SMITH. That was in 1901.

Captain MOORE. Since that we have changed the whole system of submarine mines; that is, the system of operating them. At the time we took it over we had a system devised by General Abbot, about the year 1880 or 1882. It was a system of firing mines by electricity which was extremely dangerous. To put a resistance in and send a current through there was the only way of testing. That might go off and destroy the lives of everybody around there. We now use a direct current for testing the circuit, and we have an alternating current for firing.

Mr. SMITH. That is not an explanation of this change, however, in anything like a full degree, as to this $4,000,000.

Captain MOORE. If you will look up the record of the war with Spain you will find, I think, that none of our harbors were mined.

Mr. SMITH. This was in 1901, and General Wilson said you had everything. Then the Artillery came in last year and said there was nothing complete. Of course, that is merely a difference of opinion. [Laughter.]

Captain MOORE. That can come from another reason. The subject of mining was a very minor consideration to the Engineers. A very few of their officers were interested in it. They had a school at Fort Totten, at which that subject was gone into, but elsewhere they had no interest in it.

Mr. SMITH. What is the relation between the cost of the mine material and the cost of building the casemates, and galleries, and general plant? What is your condition now as regards the acquisition of mines for your torpedo stations?

Captain MOORE. We need very few now to complete the whole installation. We only need 1,066 mining cases to complete the whole installation and the reserve.

PURCHASE OF SUBMARINE MINES, ETC.

Mr. SMITH. From what items do you get your explosives?

Captain MOORE. We get those from the mining material—not the casemates. It is not in the item on page 7.

Mr. SMITH. The other item is on page 16?

Captain MOORE. We buy the explosives out of the appropriation on page 16.

Mr. SMITH. What is the language that covers explosives?

Captain MOORE. "For the purchase of submarine mines and necessary appliances to operate them for closing the channels leading to our principal seaports." You can not operate them without explosives.

Mr. SMITH. It says "appliances." Do you regard an explosive as an appliance?

Captain MOORE. Yes, sir; I think it most certainly would be in that case. The mine would be useless without the explosive.

Mr. SMITH. If we should conclude—without venturing to express an opinion on that—to increase above the estimate on page 6, is the item then balanced with the item on page 16?

Captain MOORE. Yes.

Mr. SMITH. That is to say, if we gave you what you estimate—this estimate, $600,000, your item on page 16—that would be sufficient for that feature, even though we increased the item on page 6 relating to the other feature? I am asking you practically whether the item on page 16 is balanced with the estimate on page 6.

Captain MOORE. It is contemplated to buy one-third of the equipment necessary in the United States from the item on page 16.

Mr. SMITH. What is the fact as to the items on page 6 being items that could be gotten along without, excepting the tanks, in large measure? That is, can you install temporarily, on emergencies, a submarine mining system without casemates and cable galleries?

Captain MOORE. Well, you have to lay the cables from some point of the fortification out to deep water and protect them, otherwise a

projectile might fall on your system and put the whole thing out of action. The principal expense of this installation is the storehouses, which are absolutely needed. The mining materials are really very bulky. The mines are large. They have to be protected from the water and kept indoors. The mooring rope and all other material needed, of course, occupies a lot of space.

Mr. SMITH. You have these mine cases already on hand? They are stored somewhere, are they not?

Captain MOORE. Yes; some of them are stored in places that are very unhealthy for them. We had trouble with them last year. We had a lot of trouble in keeping them in repair.

CONSTRUCTION OF MINING CASEMATES, CABLE GALLERIES, ETC.

Mr. SMITH. What do you mean to cover and include in the mining casemates?

Captain MOORE. It is simply a small room with sleeping quarters next to it. In one room we have an oil engine and a rotary transferrer and a switchboard. Each mine has its separate little switch and the panels to operate it with. That is one of the most expensive parts of our equipment.

Mr. SMITH. How many tanks do you lack for the cables you have got in?

Captain MOORE. We lack 19 tanks. That is to say, at 19 places we have not got sufficient tanks. At some of those places it may be necessary to have 2 tanks each, but there are 19 points where we do not yet have tanks.

Mr. SMITH. For the cables you already have?

Captain MOORE. No; for the cables that will be required for the complete installation.

Mr. SMITH. What are those points that you have not any tanks at?

Captain MOORE. Fort Popham, Fort Wetherill, Fort Greble, Fort Terry, Cape Henry, Fort Moultrie, Fort Scriven, Fort Taylor, Fort Dade, Fort Pickens (that is at Pensacola), Fort Morgan, Fort St. Philip, Fort San Jacinto, Fort Rosecrans, Fort Winfield Scott and Fort Baker, and Fort Stevens and Middle Point.

Mr. SMITH. How important are these in the scheme of fortification?

Captain MOORE. San Francisco is a very important one. The mines are operated from Fort Winfield Scott and Fort Baker. Most of the material will be stored at Fort Baker. I should think Narragansett should also be extremely important—the entrance to Newport and the navy-yard; and also Cape Henry is very important.

Mr. FITZGERALD. Where is Fort Terry?

Captain MOORE. It is one of the defenses going into the Sound—Long Island Sound—near Fishers Island. We have a complete line of defenses from Mansfield, R. I., over to the eastern end of Long Island.

Mr. SMITH. General, you said you wanted to say something further, believe.

FIELD-ARTILLERY TARGET PRACTICE.

General MILLS. Yes; I expected you would ask me some questions about field-artillery target practice. I can not find any item in the bill about it. It was an increase that we wanted.

Captain WILLIAMS. That is on page 12—the item for field-artillery practice.

General MILLS. I would like to say something about that, unless the Chief of Ordnance has given you all you want to know on this subject.

Mr. SMITH. The Treasury balance under that item was only $53,000.

Mr. KEIFER. And how much unallotted?

Mr. SMITH. Twenty-three thousand dollars.

General MILLS. I would like to say under that heading, then, Mr. Chairman, if you care to hear me, that the appropriation under this head amounted to $77,000 last year. The estimate submitted this year is $100,000, for the $77,000 appropriated was not enough to allow us to have the necessary practice, especially as our field artillery has just been entirely rearmed with the new 3-inch rapid-fire gun. Target practice conducted by the batteries equipped with the new material is very different from what it was when the batteries were equipped with the old 3.2-inch. With the old material target practice consisted in firing at a line of targets, which line could be seen perfectly from the guns. This was known as direct fire, and was the only practical way of using the old 3.2-inch material. With the new 3-inch long recoil material the method of target practice has been completely changed, as we have for the first time been able to make practical use of the theory of indirect fire with our field artillery.

By indirect fire I mean firing at a target which can not be seen by the men at the guns. Indirect fire necessitates a more perfect training than was ever thought of before; for with this system each officer and man must do a certain part of the work, and if the work of any one individual is defective it throws out the work of all of the other men. The only way we have of knowing whether a battery is well trained is by getting the results of the target practice of that battery; in other words, a battery is efficient or inefficient according as to whether it can shoot straight or not.

The introduction of the new field material has also changed target practice in many other respects; for instance, with the old material it was the custom at one time to set up your targets at some point, then measure as accurately as possible the range to a certain position, bring your guns into battery at that position and commence firing. Of course, under such conditions the only error that could be made was by the gunner, and if he set off the correct range on the sight and aimed at the target properly, every shot was practically a hit—had to be, for our old 3.2-inch gun was very accurate, especially with black powder.

Now the method pursued is as follows: These targets are set up at some point the exact position of which is unknown to any officer or man of the battery; the battery is then brought into position at some point by direction of the battalion commander, the location of which with respect to the targets is also unknown to anyone in the battery. The targets are then pointed out to the battery commander, and he is told to open fire on them. If it is an indirect fire problem (over four-fifths of the problems are), the battery commander has to first choose a location from which he can see both the guns and the targets; then he has to calculate the range from the targets to the gun, choose an aiming point, and calculate the other information required at the guns before fire can be opened; then he opens fire with his battery, and makes the necessary corrections until the fire is so regulated that it

reaches the targets, when the command to cease fire is given, for we know that the guns shoot accurately, and that therefore any further use of ammunition would simply be a waste of good material.

As can be seen from the above we have changed the target practice regulations and brought it to a point where it simulates war as nearly as possible. In other words, at present instead of shooting at known ranges, we shoot at unknown ranges; instead of counting hits on the targets, we count the time and number of shots required to get on the target.

Out of the $77,000 appropriated last year we were able to spend $68,500 on ammunition for practice; the rest ($8,500) being used for the purchase of targets and other necessary material. With this amount we were able to allow each battery 210 rounds of service ammunition, divided as follows: 195 shrapnel, 15 shell. This amount is not nearly enough to give the battery the necessary training in this important subject.

If the $100,000 asked for is appropriated, we expect to be able to spend $90,000 on ammunition for service practice, the rest being needed for targets and the necessary material. With this amount we will be able to have battalion practice and the individual battery practice, which is most important, as up to the present time, with the exception of those assigned to the provisional regiments organized last summer, our battalions of field artillery have never been able to have target practice as units, and consequently our field officers have not had any training in this respect.

It is most important, in fact essential, that they should have this training, as without it we can not expect them to be efficient—to be able to direct the fire of their battalion effectively in action.

A great revolution has certainly taken place in the field artillery of the world.

Mr. FITZGERALD. You have expended $68,000 of the $77,000 for ammunition for field practice. Has that all been used?

General MILLS. Yes; it will all be used before the season is over.

ARTILLERISTS IN INSULAR POSSESSIONS AND OTHER STATIONS ABROAD.

Mr. FITZGERALD. I would like to know, General, how many men you require to man the guns that are authorized in the insular possessions?

General MILLS. You are now speaking of seacoast defense?

Mr. FITZGERALD. Yes.

General MILLS. We have not an estimate of that.

Captain HAGOOD. We have not got the figures right here, but we could make a general estimate.

Mr. FITZGERALD. If it is convenient, I wish you would send in the number of men required to man those already authorized, and the number required to man those others, if the plans of the Taft board are adopted.

General MILLS. We have no project until we get the report of the Taft board as to what the armament in the insular possessions shall be. I have, from my own knowledge, an idea of what these plans are, but the board has not reported yet.

Mr. FITZGERALD. We have been authorizing the transfer of guns from the surplus supply in the United States to the insular posses-

sions, and a certain number of guns have been authorized for emplacement at those places of which you have knowledge, and we would like to have that information so that we can have some idea of just what is intended under this plan of fortification, as to the requirements and number of men needed at those points—Manila, Subig Bay, Guantanamo, and Honolulu.

General MILLS. Do you want anything about the guns at Guantanamo?

Mr. FITZGERALD. You mean just at the entrance?

General MILLS. Yes.

Mr. FITZGERALD. No; I do not understand that either one is contemplated at Guantanamo. For all the guns asked for in this bill have you sufficient men to man them if they are authorized?

General MILLS. No; we are short some fifteen to twenty thousand men to furnish one relief for the defense scheme that is projected.

Mr. FITZGERALD. Have you enough men to man those that are established now?

General MILLS. No; we are from twelve to fifteen thousand men short to man those in this country.

Mr. FITZGERALD. How many are there in the whole corps now?

General MILLS. The authorized strength is 18,920, but we are short about four or five thousand men. We have 13,500 men in the coast artillery to-day.

Mr. SMITH. Was it not estimated that it would take 38,000 men to man the defenses under the old plan?

General MILLS. Yes, sir.

Mr. SMITH. That will be increased in the new plan?

General MILLS. Yes; we are getting a larger armament under the Taft plan.

Mr. FITZGERALD. You say you are short about 15,000 of the men now enlisted to form a mining detail for the guns already mounted?

General MILLS. Yes.

Mr. FITZGERALD. Are you able to detail sufficient men to keep these guns in proper condition?

General MILLS. We manage to do so by placing a good many guns out of commission and just covering them with material for preserving them.

Mr. FITZGERALD. Is it not a fact that all that is necessary in time of peace is still to keep them in good shape?

General MILLS. No. We ought to drill with them every day and keep them in good order, and practice with them all the time. The men, to take care of the guns, are detached from the companies that are in commission, and so we lose their services with the guns that are in commission.

Mr. FITZGERALD. We have no jurisdiction over that subject, but still we want that information.

Mr. SMITH. So that the artillery for the seacoast defense at home alone would require 42,000 men?

General MILLS. Yes.

Mr. SMITH. And in addition to that are the insular possessions?

TARGET PRACTICE WITH SEACOAST GUNS.

General MILLS. Yes. I am so much afraid that the Chief of Ordnance has not impressed upon you sufficiently the importance of target

practice for the artillery that if you will allow me I would be glad to read a memorandum I have prepared on the subject of target practice for the seacoast guns.

Mr. FITZGERALD. What page is that item on?

General MILLS. On page 11 of the bill. This is for seacoast guns. What I spoke of a moment ago was for field artillery. You see, many things are included there in the note, but this is principally for field artillery. "Target practice" is only two words in it, and yet it is of the greatest importance. I do not know that the Chief of Ordnance would say that, but we think that it is the most important feature of the whole item.

Mr. FITZGERALD. Can you give us the amount expended for target practice for a number of years back?

General MILLS. Last year it was $400,000. The Chief of Ordnance sent the estimates to the Secretary of War. The amount we had was $296,000 last year. The appropriation was $348,000 last year. We got for target practice, however, only $296,000 of it.

Mr. FITZGERALD. How much have you left?

General MILLS. None of it left at all at the end of the fiscal year.

Mr. FITZGERALD. How much have you expended up to the present time?

General MILLS. We have it all allotted. The projectiles are bought and the powder is placed, and I presume it has all been expended.

Mr. SMITH. This being a current item, how do you account for such a large Treasury balance remaining of this appropriation? Six hundred and sixteen thousand dollars was left under this item as a Treasury balance on the first day of this month.

General MILLS. There must be some items here that they have not allotted the money for.

Mr. SMITH. It is all allotted.

General MILLS. I mean the Chief of Ordnance has not expended it. He gives us just what he can.

Mr. FITZGERALD. You got all but $50,000 appropriated last year, and over $600,000 is unexpended in the Treasury.

General MILLS. We expend every dollar that is allotted.

Mr. SMITH. This is all practically for target practice. Why do you say there are only two words there? It is also for the machinery necessary to manufacture that ammunition.

General MILLS. Would you be kind enough to let me have that unexpended balance? I would like to ask the Chief of Ordnance for some of that. [Laughter.]

Mr. SMITH. There is $616,000 of this appropriation unexpended on the 1st of January, but all of it has been allotted except about $37,000.

General MILLS. I wish we could get at it. [Laughter.]

Mr. FITZGERALD. It looks as though you were coming to the wrong place for the money. [Laughter.]

General MILLS. We used to have target practice three times a year, but because the appropriation was cut down last year we could only have it twice. It very much affects our efficiency, because a good showing at target practice represents the efficiency of the whole artillery. If you cut it down, or if you can not see your way clear to give it to us, it would be a great deprivation.

Mr. FITZGERALD. In 1905 there was appropriated for this purpose $374,000, and the appropriation for the present year was reduced below

that only $26,000, and of that you got about six-sevenths. You did not have more in 1905 than in 1906?

General MILLS. I do not remember. In 1905 we had target practice three times a year. In 1906 we had it only twice a year.

Mr. FITZGERALD. Now you have some money left, and have half a year to go yet.

General MILLS. We have no money left. General Greely knows how the appropriations are manipulated and he may tell you how the Chief of Ordnance manages it.

Mr. SMITH. The question arises whether you had not better make your application to the Chief of Ordnance rather than to this committee.

Mr. FITZGERALD. Do you not have more for target practice during the two parts this year than you did in the two parts last year?

General MILLS. No, sir; the amount has been reduced that much and there is that much less practice.

Mr. KEIFER. The practice has been reduced one-third?

General MILLS. Yes. Now, may I read this memorandum?

Mr. SMITH. Yes.

Mr. FITZGERALD. We would be glad to have that.

Mr. KEIFER. I think it should go in.

General MILLS. This is a memorandum which I have prepared under date of January 26, 1906. [Reads:]

"War Department, Office of the Chief of Artillery, Washington, January 26, 1906.

"Memorandum relative to the estimates for coast artillery practice, etc., for the year ending June 30, 1907.

"I. The Chief of Ordnance submitted to the Secretary of War an estimate of $400,000 'for the purchase, manufacture, and test of ammunition, subcaliber tubes, and other accessories for seacoast artillery practice, including the machinery necessary for their manufacture at the arsenals;' and the Secretary incorporated the estimate without reduction in the Book of Estimates.

"It will be observed that not all of the $400,000 is available for obtaining ammunition, for out of it must come the cost of subcaliber tubes, the cost of targets, and the expense of acceptance tests by the Ordnance Department. It is probable that the sum to be allotted by the Chief of Ordnance for the purchase of ammunition for target practice will not exceed $345,000.

"The amount estimated for last year was $450,000; the amount appropriated for the entire item was $348,000, but the amount allotted for ammunition was only $296,000. The amount allotted for the purchase of ammunition is used in procuring the necessary powder and projectiles for service practice, the necessary fixed ammunition for subcaliber practice, and the blank charges and primers used at drill.

"The approximate cost of a round of ammunition for service practice with each of the large caliber guns is as follows:

12-inch gun	$240.00
10-inch gun	140.00
8-inch gun	80.00
12-inch mortar	56.00

"The approximate cost of a round of ammunition for the largest rapin-fire gun, the 6-inch, is $30, and the approximate cost of a round

for the smallest rapid-fire gun of the fixed armament, the 15-pounder or 3-inch, is $7.

"Mortars and 12-inch guns are used effectively at ranges as great as 6 or 7 miles, and 10-inch and 8-inch guns at ranges as great as 5 or 6 miles.

"There are now mounted in our coast fortifications:

376 12-inch mortars.
105 12-inch guns.
132 10-inch guns.
96 8-inch guns.
517 rapid-fire guns.

1,226 total.

"It is desired to assign the 126 companies of coast artillery to calibers for practice about as follows:

37 companies to 12-inch guns.
18 companies to 10-inch guns.
9 companies to 8-inch guns.
43 companies to 12-inch mortars.
19 companies to rapid-fire guns.

"Each company assigned to 12-inch, 10-inch, or 8-inch guns should have at least 15 full service rounds for use in target practice; each company assigned to mortars should have at least 38 rounds, and each company assigned to rapid-fire guns should have at least 30 rounds, which would require for service practice alone about $280,000.

"For subcaliber practice and for drill primers and blank ammunition would then remain only $65,000 of the probable allotment of $345,000. The cost of the .30-caliber ammunition used as subcaliber ammunition in the smaller rapid-fire guns is $25 per thousand, while the cost per round of the subcaliber ammunition used in large guns and mortars is approximately $1 and $3, respectively; and it is desired to have each company fire annually in subcaliber practice from 150 to 3,000 rounds, depending upon the cost of the subcaliber ammunition and upon the rapidity of fire appropriate to the guns to which the company is assigned.

"II. The reasons for stating 15 rounds as the minimum number of full-service charges to be expended annually in practice by one company of coast artillery are two in number. In the first place, it is not believed that efficiency can be attained and maintained with less practice each year, and, in the second place, it is believed to be necessary to the maintenance of efficiency to hold practice at least three times a year, while firing fewer than five shots on any one occasion is not to be seriously considered.

"In support of the adopted annual minimun of 15 rounds of service ammunition may be quoted the following recommendation of the board appointed pursuant to a provision of the act of Congress making appropriations for fortifications and other works of defense, etc., approved June 6, 1902:

"'We therefore recommend abandoning practice with reduced charges, substituting subcaliber practice therefor, asking for appropriations large enough to enable each company of Coast Artillery to have annually at least 15 rounds for target practice with full service charges.'

"The board that made the recommendation consisted of the Chief of Artillery, two other artillery officers, an engineer officer, an ordnance officer, a naval officer, and Mr. John R. Freeman, of Providence, R. I., a mechanical engineer of high standing; and the recommendation was approved by the Secretary of War, Mr. Root.

"More rounds are required for mortars than for guns because the unit of fire in the case of mortars is a pit of four.

"It is desired to have a greater number of companies practice with 12-inch guns and 12-inch mortars, because these are the only pieces of our ordnance that can penetrate the vitals of a battle ship."

I would like to have that go in as part of the hearing.

Mr. SMITH. We would be glad to have that incorporated in the hearing.

I am surprised—I do not know whether the others are or not—but do I understand that the same body of troops is not trained to fire? I mean with a single type of gun?

General MILLS. We do change them occasionally; about every two years.

Mr. SMITH. Do I understand that if you have a company this year firing 12-inch guns they will fire only 12-inch guns and have no experience with the other guns, and that they will be specialists only with these 12-inch guns?

General MILLS. Yes; but there is not very much difference, after all, between the two guns. The men can be pretty well trained for the different guns. The appropriation will only allow us to assign a company to a particular kind of gun for target practice and instruction.

Mr. SMITH. Is that true for our field artillery practice?

General MILLS. They have practice once a year.

Captain MOORE. We want to divide the practice up there into battalion practice and battery practice. The practice would be at the same time. They would succeed one another.

Mr. KIEFER. It is the same kind of practice?

Captain MOORE. Yes; except that two or three batteries are firing together, under the direction of the battalion commander.

Mr. FITZGERALD. Could not that training by battalion commanders be done entirely by subcaliber practice with equal benefit?

General MILLS. We have no subcaliber for field guns.

Captain MOORE. That is used merely to train the men how to aim in direct fire.

Mr. SMITH. Only on direct fire, the subcaliber practice?

General MILLS. Yes.

Mr. FITZGERALD. I mean on the coast guns. Do you have subcaliber practice for that?

General MILLS. Yes; succeeding every regular practice we have subcaliber practice.

Mr. SMITH. You do not mean that it is done half a year alone?

General MILLS. No; our system of fire control we use especially in this subcaliber practice. That is where we get our excellent training.

Mr. FITZGERALD. Last year you expended $364,000 for artillery practice——

Captain WILLIAMS. Two hundred and ninety-eight thousand dollars.

Mr. FITZGERALD. This year you ask for $500,000.

General MILLS. We have only $350,000, or will have that allotted probably. The rest will go to the other items mentioned in the bill.

Mr. FITZGERALD. You got all but $61,000 out of the entire appropriation for last year, which amounted to $425,000. You got all but $61,000.

Captain WILLIAMS. Yes; this year we are counting on getting all but $55,000, the difference between $345,000 and $400,000, the sum estimated for.

MONDAY, *January 29, 1906.*

SIGNAL CORPS.

STATEMENT OF BRIG. GEN. A. W. GREELY, CHIEF SIGNAL OFFICER, U. S. ARMY.

FIRE CONTROL.

Mr. SMITH. Now, General Greely, we do not intend to bother you much to-day on this subject of fire control. As I understand it, you got $410,000 out of this last appropriation?

General GREELY. Yes.

Mr. SMITH. Can you give us any estimate of how much money heretofore appropriated for fire control has been expended for temporary work?

General GREELY. I think I spent about $40,000 last year, and with the $21,000 which I asked for this year—I think it was $21,500—I can put every one of the posts designated by the Chief of Artillery in a condition for target practice. That is what they want.

PURCHASE OF RANGE FINDERS AND THE INSTRUMENTS OF FIRE CONTROL.

Mr. GRAFF. General, just before you proceed, I want to state to the chairman, so that it will go in the record, that one of the officers showed me some figures just after you went out, to the effect that the item on page 10, which is on the subject of inquiry in connection with the item for a similar purpose on page 2, under the head of range finders, coupled with the question of whether they applied to fortifications as well as field batteries, meant an estimate for 36 range finders, estimated at $1,200 each, to be used in the submarine mine service; and therefore the striking out of the words "fortifications and," on page 10, would render the application of that money impossible, and for that reason those words ought to be retained.

Mr. SMITH. The objection is that while they may expend that for submarine mines, there is nothing to prevent them from expending it for anything else under the details of the appropriation.

Mr. GRAFF. The estimate was for 36 range finders, to be used for this purpose alone.

Mr. SMITH. It was expressly testified here by the Chief of Ordnance that this item of $60,00 was for instruments in connection with the Coast Artillery, using the language, "Coast Artillery." Now, I have no objection to putting in instruments for fire control in connection with submarine mines and field batteries, but I am opposed to

putting two items in this bill for range finders for coast fortifications and letting them be paid out of either item.

Mr. GRAFF. I think, then, that it might be amended as you state.

FIRE CONTROL (AGAIN).

Mr. SMITH. You said it would take $21,000 to complete the temporary installation?

General GREELY. Temporary installation? Yes.

Mr. SMITH. In constructing this work would the engineers have an additional amount, too? The installation of fire control you do exclusively?

General GREELY. I do everything connected with the installation of telephones and telegraphic instruments, and teleautographs and cables, and everything connected with the means of transmitting information to and fro. But you see we do not do anything in regard to building houses or anything of that sort.

Mr. SMITH. As I understand it, the installation of even temporary fire control involves some work for the Engineer Corps, or do you do some of that?

General GREELY. Yes; it should, but it ought to be very little, because, you see, when I put in a temporary service I put in overhead wires which everybody deems is objectionable and ought not to be done, because we do not know just exactly where the submarine cables are to go, or the subterranean cables, so as to give the means of information necessary to put up the ordinary land line. We use telephones very largely for that purpose, not the more expensive instruments.

Mr. SMITH. Is the teleautograph more expensive than the telephone?

General GREELY. A great deal more so. It is the only instrument that has been found or invented that will transmit instantaneously a definite order. For instance, you write here 92° 30′, and then 145° 15′, and 9,000 yards; that is reproduced instantly at the other place in the handwriting of the man who sent it. If you send such an order over a telephone you are never certain that it will get there accurately.

Mr. SMITH. If the Chief of the Artillery Corps makes a change in this service, and it pertains to your branch of it, they will transmit notice of it to you to ascertain what it will cost, will they not?

General GREELY. No, sir; the Board of Ordnance and Fortification formulates the system and makes the changes. Of course until within the last year or two when they proposed to make a change they have been in the habit of writing to me and asking my opinion as to whether it would be more efficient and economical, but that is entirely within their discretion.

Mr. SMITH. Who comprise the Board of Ordnance and Fortification?

General GREELY. The Secretary of War is president of it. The Chief of Ordnance, the Chief of Artillery, the Chief of Engineers, and, I think, the Chief of Staff and a civilian member, and perhaps one other member.

Mr. SMITH. You are not on the board?

General GREELY. No, sir.

Mr. SMITH. Are you able to tell in a general way how frequently

changes have been made in the designs for the seacoast fortifications in the last year or two?

General GREELY. They got up a system in about the year 1902, I think it was, known as the Barrancas system, which changed the vertical method of fire control to a horizontal base. In connection with that we were obliged to put in an installation at Portland. We expended about $100,000 there. We put it in in very great haste for the maneuvers, and I am advised that $78,000 of the plant secured by the expenditure of that money is worthless.

Mr. SMITH. Is that Portland, Me.?

General GREELY. Yes; Portland, Me. That is to say, for making a permanent system, such as is provided now, all but $22,000 of that amount is gone. I can only realize $22,000. But a year and a half ago the matter was taken up again and the thing was thrashed out quite thoroughly. The present system of fire control was approved in April, 1905, and I think it has come to stay. The tendency of the Chief of Engineers and myself and of the late Chief of Artillery is distinctly adverse to any material changes.

We all recognize that local conditions may necessitate some slight departure from an exact system. There have really been three systems, but we have now got to what I think is a permanent system. We have been operating along that line. Last year, when the question came up of taking care particularly of four districts in the country upon a permanent basis, we made our estimates of what it would cost, and I believe I was somewhere about $200,000 short, or rather we ran about $200,000 over the appropriation. But I had some money left over from the previous year, and I said, of course, I would utilize that, and if there was any shortage I expected it would be allotted against the Signal Corps, and I said it will take care of my end. I said, "Give these other gentlemen all they ask."

So it was agreed that we should put in a permanent installation in the southern district of New York, and in the eastern district of New York, and at Portland, Me., and at Boston, Mass. I was $67,000 short of what I deemed was necessary for making that installation. I started in on that line. I can pull through and not be more than $30,000 short and will fix up these stations permanently. I have bought almost everything that has been bought for them. I have my cables and instruments of every kind ready for installation.

Mr. SMITH. Now, these cables for these are mostly in conduits, are they not, General?

General GREELY. A good many of them are submarine. When they commenced to use the horizontal base system—that means long lines—we had to have two observers at a certain distance apart. The farther apart they are the more accurately you determine and fire. In quite a number of instances when they wanted a piece of land to run a submarine cable through it the land suddenly went up four, five, six, or eight times what the normal price of it was, and in quite a number of places they have had to put in long submarine cables in order to avoid paying enormous prices for land.

Mr. SMITH. They remain in place?

General GREELY. Yes. The use of the horizontal base has very largely increased the demand on the Signal Corps for the submarine cables, and they are an expensive matter.

I would like to say, so far as my own estimates have gone, that the

cost within the last two years has come within 7 per cent of my original estimates. In this very item you see included the purchase of lands and right of way. You may appropriate $1,000,000, and you do not know whether $10,000 or $100,000 of it is going into the purchase of lands.

Mr. SMITH. What was your unexpended balance, General, of this fund?

General GREELY. I think I have now somewhere about $70,000.

Mr. SMITH. Is that unallotted as well as unexpended?

General GREELY. No; it is all allotted, but I am quite certain that I have not more than $70,000 left. There may be some few bills for cables that are in process of settlement now, but the supplies in everything up to within $70,000 of my allotment have been actually purchased and delivered to the Government, and are ready for installation.

Mr. SMITH. Has any fire-control system been established and installed on the plans of last April?

General GREELY. The fire-control system at the national capital here, Fort Washington, I think you may call it absolutely completed. Our own Signal Corps part of it is 90 per cent completed. There are some little trifling things, 10 per cent, that are not completed. I do not know exactly what they are. I think there are some slight changes that are waiting on the work of the Engineers, but I understand that their work is practically completed.

It is the same way at Fort Totten. The temporary installation which we put in there is really and practically a permanent one, and of course we are only waiting for the spring to follow the Engineers. We could have completed our work there this winter, but we have to wait, you know, on other people. We can not put a switchboard into a house until it is built. But I have really everything on hand for these four stations, and, in addition to that, I did a large amount of work at Philadelphia and Baltimore and Fort Monroe.

Mr. SMITH. What has been done with reference to fire control in the insular possessions?

General GREELY. I have done nothing. I have had no demands made on me for it.

Mr. KEIFER. Does your estimate ask for anything for next year?

General GREELY. My estimates have been cut very much, and incorporated here. I do not know how much of this money will go to me. I asked for over $900,000 this year to cover all emplacements that are actually finished.

Mr. KEIFER. In the insular possessions and all?

General GREELY. I do not know whether there are any abroad or not. I could not tell you that. Nine hundred and ninety-two were completed when I made my estimates; but I have not been called upon for anything abroad.

Mr. KEIFER. You want about $1,000 for each?

General GREELY. I expect so. Of course a good deal of this money, about $120,000, is necessary for the annual maintenance. You see that that must be taken out. You can not consider that as expended in building a new installation. You gentlemen all know how delicate an electric installation is. You put in an installation of that kind which costs half a million dollars, and it is going to cost you

$75,000 for its deterioration. Fifteen per cent is pretty well within the actual amount of deterioration of electrical installations, as I am advised, throughout the country, and experience shows the same thing.

Mr. SMITH. About what do you think is the length of life of your work—the sea-coast defense in connection with fire control?

General GREELY. The life of what we put in, I should say, should be twenty years.

Mr. KEIFER. What do you mean—would it terminate its life? In other words, what would be the condition in twenty years?

General GREELY. The telephones and teleautographs and storage batteries and delicate appliances of that kind will suffer, as you gentlemen must realize, when they are placed down by the ocean, you know, where they are exposed to the salt air and where they are handled by the enlisted men of the Army. They are turned over to the artillery for operation. Some of the instruments come in, you know, showing almost wanton destruction and injury sometimes. We had one clock, an expensive clock, which it was claimed did not run well, and when it was sent down for repairs we found that they had been putting matches and other things in between the cog wheels. [Laughter.] You can imagine how a fine clock comes to grief in that way.

Mr. GRAFF. Your estimate for twenty years of life for this service is dependent upon its being properly maintained?

SUBMARINE CABLES, ETC.

General GREELY. Yes. Your storage battery will probably go to pieces in six and seven years, and, I suppose, telephones will not last much longer than that. But, on the other hand, your cables ought to last from twenty-five to thirty years, or even forty years. Then comes the question in regard to cables. You put them on grounds which are not anchorage grounds, and a ship comes along and anchors there in bad weather, and when she pulls up her anchor and your cable is on it she cuts it. On December 20 last we had a 50-pair cable torn out between Fort Hamilton and Fort Wadsworth, in New York Harbor. Another ship pulled out a Western Union cable at the same time. Of course, there is a law which protects us, but you know how difficult it is to protect yourself in that way. Storage batteries are expensive. The great cost lies in the submarine cables and telautographs. Those two items are the most expensive.

Mr. SMITH. Are telautographs very durable?

General GREELY. No, sir; they are not. They will not run a year without repair. If they do that they will be doing very well. We have been experimenting in the last year or so in trying to get some instrument which will replace the telautograph.

Mr. KEIFER. You do not mean that the system you have installed will die out in twenty years?

General GREELY. Not at all.

Mr. KEIFER. But that this 15 per cent of cost must be renewed?

General GREELY. Yes; that is the technical commercial term, "the average life."

Mr. KEIFER. It still goes on?

General GREELY. Yes.

FIRE CONTROL (AGAIN).

Mr. SMITH. Is there no way by which we can get from anybody an idea of what it will approximately cost to install this fire-control system in accordance with the plans of the Taft board?

General GREELY. I do not know that anybody can tell you. The difficult man is the Chief of Engineers. I can tell you what it will cost so far as the Signal Corps goes.

Mr. SMITH. Can you give us an idea of what percentage of this work is permanently done?

General GREELY. So far as the Signal Corps is concerned, we guarantee that the eastern and southern districts of New York, Boston, and Portland, and Fort Washington—those five districts—shall be completed with the money we have got already. So far as we are concerned, you can consider those districts as permanently and entirely cared for; and beyond that, as I said, excepting as to the sum of $21,000, I can guarantee that every battery that is in commission to-day shall be provided out of that money so that they can have target practice at temporary installations.

Mr. SMITH. Now it takes $120,000 for maintenance. Can you give us any idea at all, General, of what the maintenance would be when this system is completed with the existing fortifications?

General GREELY. It will be from 10 to 15 per cent of the money that has been put on it originally. It can not be less.

Mr. SMITH. So that the mere maintenance of this is apt to go up to half a million dollars a year?

General GREELY. Not of the fire control.

Mr. GRAFF. You are speaking of the fire control?

General GREELY. Yes.

Mr. SMITH. I understood you to say it was $120,000. Did I misunderstand you?

General GREELY. It is $120,000 now. So far as the Signal Corps part of it goes I suppose the chances are that it will run up to $200,000. It could not run higher than that, so far as the Signal Corps part of it goes. I can not tell you how rapid will be the deterioration of the guns, or of the range finders, or of the equipments—the searchlights and other things provided by the Corps of Engineers.

Mr. SMITH. The buildings are rapid in deterioration—the kind they are building now? They are frame buildings.

General GREELY. Some are frame buildings, and I saw this at Fort Hamilton, and I think it is inadvisable. I said I hoped there would be a fire there some day that would clean out the whole of that, but it is not my business to interfere with it.

Mr. SMITH. What other branches of this bill are you interested in, General?

General GREELY. None whatever.

Mr. SMITH. Is there any statement you would like to make to the committee before we close the hearings?

General GREELY. None whatever; but I should be glad to answer any questions you may ask.

Mr. FITZGERALD. What particular buildings at Fort Hamilton do you refer to?

General GREELY. Those that are put up for fire-control purposes. There are a number of wooden structures there that are not very large and which I think ought not to be put in any post.

Mr. FITZGERALD. Are they close to the barracks?

General GREELY. No; there are quite a number of them together. I think there should be permanent fire control. I do not believe in extravagant structures, but I think there should be some kind of buildings put up that would answer better than ordinary wooden structures.

Mr. FITZGERALD. Have they any system of fire protection at all in those buildings?

General GREELY. I suppose they have. They have in every military post.

Mr. KEIFER. These are not put up with a view of resisting shots from the sea. They would all be destroyed by that if hit.

General GREELY. Yes; they are all low buildings—all inexpensive structures. The criticism I make is that not enough money has been expended on them.

SUBMARINE CABLES (AGAIN).

Mr. BRUNDIDGE. I believe you stated, General, that the cables necessary for the installation of these stations might last from twenty to thirty and forty years.

General GREELY. Yes.

Mr. BRUNDIDGE. My recollection is that the evidence before this committee, possibly on this same item, a year or more ago was to the effect that all the cables which the Government had planted during the Spanish war, when taken up were found to be practically worthless—not worth anything, of no account at all—on account of deterioration. How do you account for that? Was the character of cable then in use so far inferior to what you are using now?

General GREELY. When the Spanish war broke out there was only one officer in the Army who knew enough about submarine cables to prepare a scheme for their use. That was Col. James Allen, my principal assistant. He knew enough to draw up a scheme for submarine cables. A great many of the cables for mining and other purposes for the Spanish war were altogether worthless.

Mr. BRUNDIDGE. Were all?

General GREELY. No. The officer in command at Fort Totten, who received these cables from the Corps of Engineers, told me that he had 800 miles of cable that was utterly worthless when taken up, and that he did not know what to do with it. When the Portland maneuvers were about to take place I could not get the cable in time from firms, and I was told I could have some of this cable. I said I did not want it; it was not worth using. But one of the officers of artillery recommended to the commanding general of the Department of the East to take it, and he wrote to me that he would send a lot of it up to Portland and expected me to lay it. I wrote to him afterwards that I was obliged to him for his courtesy in helping me out; that I had laid the cable, and hoped its condition would be better than I expected. The cable was laid, a lot of it, and 75 per cent of it was utterly worthless inside of forty-eight hours. I could not transmit any messages over it or do any business with it.

Mr. KEIFER. What was the trouble with it? Was there a defect in its original construction, or was its bad condition when you got it due to deterioration?

General GREELY. I never examined that, General. I have had so much to do to attend to my own business that I did not have time. [Laughter.]

Mr. KEIFER. I thought it might have come to you, or might have been reported. That is a remarkable statement, if it is not good for more than two or three years.

General GREELY. If you want information on that point you can ask the artillery as to what was the condition of the cable as turned over to it by the engineers.

Mr. SMITH. It was stated, just as the General says, that they had no officers familiar with the subject at that time, except the one, and that this cable was bought hastily, and may not have been intended for that specific purpose; and that while it operated for a time in some instances, in other cases it ceased to operate as soon as it was taken up, and sometimes even before it was taken up.

General GREELY. Of course, if this cable is made of gutta-percha and taken up and stored, it is bound to deteriorate at once. I now use a cable of gutta-percha and seamless rubber, and I do not think there is a single instance, at least not more than one, in which we have had serious trouble with our own Signal Corps cables."

Mr. SMITH. Do you store them in fresh-water tanks?

General GREELY. We store some of them where the changes of temperature are not great. They should be stored in water. I have not had the money to store them there. I buy cable only when I need it. Sometimes we will have 40 or 60 or 100 miles surplus, and if we can not put it in water we put it where it is out of the sun and where the changes of temperature are very moderate.

Mr. SMITH. Is this cable covered with lead, like the commercial cables used in conduits in cities?

General GREELY. That depends on where you use it. If we use it in conduits—subterranean cables—it is lead covered.

Mr. KEIFER. You mean by lead covered lead tubed?

General GREELY. No, sir; lead covered. If it is a submarine cable it is necessary to have that armored, so that there will be strength to the cable, and so that you can pick it up and repair it and take care of it.

I have been lately using paper cable. The demands that have been made on us for cables have been so great, and the cost of them has been so great, that it has been prohibitive almost of the use of rubber for a large number of the conductors. For instance, we have a modern system of fire control, as approved by the Board of Ordnance and Fortification, and we are required to put 144 conductors between Forts Wadsworth and Hamilton, across the Narrows. I already put in one and am to put in two others. I put in one 25-pair cable, a paper cable, leaded and armored.

Mr. SMITH. That is similar to the cable used commercially in the streets of cities?

General GREELY. Yes. My intention is to follow closely the commercial methods. I consult with the leading men of the country and consult with the different manufacturers, and try to keep up, so that

we have reduced the cost of this new system very materially. As I said last year and say again here, the introduction of the horizontal-base system throws an enormous burden on the Signal Corps, but it really saves money in the long run, or ought to.

Mr. SMITH. What is this armor?

General GREELY. Steel wire, No. 9 and No. 8. For instance, we will have 8 or 9 or 12 or 10 wires wound around the outside, so as to give it great strength. It enables you to pick up the cable and move it. If a vessel picks it up and it is one of those large cables, they frequently have to let go their own anchor. But if it is light they most always cut the cable.

Mr. FITZGERALD. Is the paper cable satisfactory?

General GREELY. It ought to be. A piece of it was pulled out on the 20th of December between Forts Hamilton and Wadsworth, as I mentioned a moment ago, but we put it back again. It is cheaper.

Mr. KEIFER. How is it as to durability?

General GREELY. Neither one of those kinds, paper or rubber, should deteriorate for a number of years. Most of the trouble we have had with our cables has been through mechanical injuries, through their being picked up by anchors, or things of that kind.

Mr. KEIFER. Breaks and things of that kind due to that cause?

General GREELY. Yes.

Mr. KEIFER. What is the diameter of the cable you usually use?

General GREELY. The diameter of a single conductor cable, a deep-sea cable, is about the diameter of my thumb. A 25-pair paper cable would be about 2½ inches in diameter. A 10-pair rubber would be very near the same as a 25-pair paper cable.

Mr. SMITH. These would not be large wires?

General GREELY. No; the wires are all small, particularly in the paper cable.

Mr. SMITH. The dimensions you give would indicate larger wires than are used for telephone service?

General GREELY. The paper insulations have to be insulated one from the other. It is bulky. That is due to the little covering around it.

Mr. KEIFER. I have a section of the cable which was cut in Manila Bay. It must be 2½ inches in diameter.

General GREELY. That must be the shore end of it. It has one conductor?

Mr. KEIFER. Yes; it had but one conductor, but it had a series of coverings.

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